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MISSOURI BOTANICAL GARDEN

BULLETIN

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Missouri
Botanical
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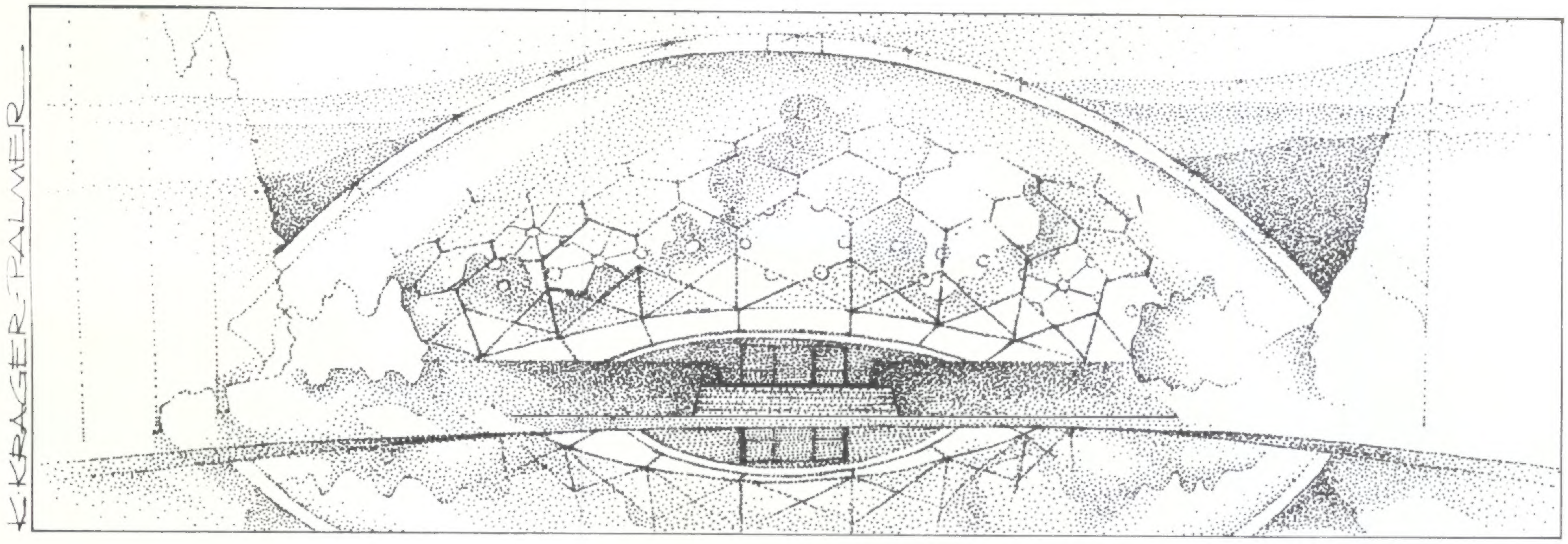
Bulletin

Volume LXIX Number 1
January/February 1981

The Climatron At Twenty



In 1958, Frits Went, who would later be named Director of Missouri Botanical Garden, visited the Garden and noted in his diary, "The greenhouses are all old and in poor condition. It might be possible to patch them up so that they will last another 5 or 10 years, but it seems to me there is little sense in doing that.... Therefore new houses, new in design, in engineering, and in function, are indicated at present . . . " In August of that same year, while he was visiting Chicago, he wrote, "At the Garfield Conservatories I was struck again by the fact how the superstructure of a greenhouse can be distracting. The less obvious it is, the better."

Eugene Mackey, Jr., son of the late Eugene Mackey, Sr., the principal architect for the Climatron, remembers how Went proposed the idea for the structure of a new greenhouse. "I remember Frits' challenge to my father, which was ' . . . I want to create a columnless space for this greenhouse' . . . and, of course the dome was really the only way to achieve that, because the structure is transferred along the curve." Harry Richman, who worked with Mackey, Sr., (in the firm of Murphy & Mackey) in designing the Climatron in 1959, commented on the shape selected, saying ". . . while the circular form lends itself nicely to the climatological characteristics and properties within [it], I'm sure any architect would be very much attracted to the very simple geometrical form of a sphere. It's one of those things that is historically very compelling, and I have an idea — that I think many will agree with — that one of the first impulses of an architect would be to enclose a space with this particular kind of form . . . it all fell into place as a very compatible system — handling all of the climatological requirements, the structural requirements, the shape, the functional needs and so forth . . . [Mackey] developed a very attractive and forceful concept."

Eugene Mackey, Sr. devised the name *Climatron,* responding to Went's expression that he wanted it to be a climatological laboratory. Went had previously considered *plantosphere, sylvarium* and *floradome.*

For their design, which was based on principles devised by R. Buckminster Fuller, Murphy and Mackey, Architects, (since renamed Murphy, Downey, Woffard & Richman) received the 1961 R. S. Reynolds Memorial Award, given each year by the American Institute of Architects. The award is an international one, presented to the designer(s) of a "significant work of architecture, in the creation of which aluminum has been an important contributing factor." The award was instituted in 1957; Murphy and Mackey were the first American architects to receive it.

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Book Review

Tallgrass Prairie: The Inland Sea
by Patricia Duncan
(Forward by Stewart L. Udall)
Lowell Press, Kansas City (1978)
104 Pages (113 color photographs)
$12.95/paper

Before I ever saw a prairie, Patricia Duncan introduced me to its expansiveness and beauty through its seasons, animals and people. Her book sparked my curiosity about our American grasslands; revealed the prairie's dynamism; and chronicaled our nation's use of the prairie soil. She records the interaction between farmers and ranchers and the American prairie.

In her book, Patricia Duncan gives us the prairie vista in a manner through which we can understand that we do not dominate the landscape, but it dominates us.

She immerses us in the color of prairie flowers and grasses, in the saturated atmosphere of a prairie sunset, in the bright clothing of prairie residents on the Fourth of July, in the plumage of the prairie chicken. She combines landscape photography with close-up photography to capture the immensity of the prairie and the delicacy of individual plants and insects.

The book is a celebration of beauty, the magnificence of the prairie community and the interaction between it and its people, past and present. But it is beauty with a point: to awaken us to an understanding of the fragility of the prairie; to an understanding that this is a part of our heritage that we must preserve. In her final paragraph, she says: "Yes, the prairie was in my blood before I was born. Rachel, my grandmother, saw to that. And it will be there when I die. Right now, I still hop around the landscape trying to drink it all in before it's gone."

— George U. Wise,
Superintendent, Shaw Aboretum

* * *

There is a Prairie Preservation Project at Shaw Arboretum. Persons contributing $25.00 or more to that project will receive an autographed copy of *Tallgrass Prairie: The Inland Sea*. Call 577-5138 for information. - ed.

Letter From China — Part II

Along the trail up Mt. Omei.

From Beijing we flew on August 21, 1980, to Chengtu, the capital of Sichuan (Szechuan) Province. Sichuan Province, which is the size of Texas but with a population of over 100 million people, is the largest province in China. Around Chengtu is some of the richest agricultural land imaginable. There are houses with white plaster walls, surrounded by dense thickets of tall bamboo; rich rice paddies; and mulberries, grown in lines along the paths in the rice paddies and irrigation ditches, to provide food for the silkworms.

The next day we spent in Chengtu visiting the Chengtu Institute of Biology at the Chinese Academy of Sciences, and the University of Sichuan, giving a lecture at the former. There are quite a few foreigners in Chengtu, including visitors, but westerners are still scarce enough so that we were more an object of curiosity there than we were in any other place we visited in China.

Early in the morning on the 23rd, we left for Mount Omei, where we had been given permission to conduct studies of *Epilobium,* a genus of plants which Tamra and I had studied before and about which we had written a book during a year we spent in New Zealand, 1969-70.

As we started the drive to Mount Omei, some 100 miles south of Chengtu, we observed an incredible scene; it was Saturday, market day, and literally thousands of people were walking and riding bicycles; tricycles and even a few unicycles along the road toward the markets in the smaller country towns. Some were driving or riding water buffalo; some carrying pigs in cages. Others had butchered pigs across the back of their bicycles, a few, huge loads of pots, rice, herbs, grains, brooms — anything that could be sold or traded in the markets. What seemed to be an unending procession passed by the windows of our van for the whole morning.

After a lunch near the foot of Mount Omei, we began hiking in a gentle rain, at about 2500-feet elevation up the trail that lead eventually to the summit, at some 10,500-feet elevation. Mount Omei has been a sacred place for Buddhists since at least 200 A.D., and there are over 70 temples that dot its slopes, particularly at the middle and upper elevations. It has, for two millenia, been the object of pilgrimages for faithful Buddhists from all over China and other countries. Many of the temples offer overnight accommodations and it was in these that we were to stay for the next three nights while we were on the mountain.

The vegetation of Mount Omei, and similar places in southwestern China, provides an indication of what the forests of the eastern United States and Europe might have been, if they had not been so badly disrupted and destroyed by glaciers during the past million years. Conditions for the survival of plants have been far better in eastern Asia and have lead to a situation where, for example, on this single mountain there are found five genera of the walnut family, five of the beech family, 19 genera and at least 65 species of the buttercup family, 18 species of the magnolia family, and no fewer than 42 species belonging to seven genera of the laurel family as well as, among other plants, nine species of *Hydrangea,* no fewer than a dozen species of wild cherries and their relatives, 17 native species of wild roses, about 40 species of wild blackberries, more than 15 wild hollies, 20 kinds of maples, six camellias, about 30 species of *Rhododendron* and other great botanical riches. In most cases, these figures greatly exceed the total for all of North America — remember these are figures for just one single mountain!

On Mount Omei, explored by the famous horticulturist E. H. Wilson early in this century, there are three very distinct elevational zones of vegetation; a lower zone of very rich, mixed broad-leaf forests in which *Cunninghamia,* a relative of the bald cypress, is frequent; a middle elevational zone in which rhododendrons and conifers, such as the fir *Abies farberi,* are well represented; and near the summit, scrubby thickets of bamboo and *Rhododendron* and very scattered individuals of *Abies farberi.* At the very summit of the mountain there is an area known as Ging Ding — the Golden Summit — and here, until about 1800, stood a temple made entirely of bronze. The cliffs drop off precipitously at the summit, falling for over a mile vertically. From these cliffs may occasionally be observed a spectacle of the sun illuminating the clouds in a rainbow-like appearance, similar to the Specter of Brocken in Britain, which the faithful regard as the visible manifestation of Buddha in all of his glory.

The Pavilion at the junction of Black Dragon and White Dragon Gorge, Mt. Omei.

We spent our second and third nights on the mountain at the Xi Shang Temple at about 6500-feet elevation, and climbed the mountain from this temple. The whole trail all the way up and down the mountain was crowded with tourists enjoying the beautiful mountain scenery, cliffs, and trees. Over the centuries, the trail has been paved with large blocks of stone in most places, actually making stairs. In

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Letter From China

(Continued from Page 3)

Hikers up Mt. Omei.

our whole hike, which took the better part of four days, we covered some sixty miles and rose and descended about 8000 feet, making nearly fifty collections of plants in the evening primose family for later study. Mount Omei is located about eighty miles from the end of the Himalayas, which occasionally may be viewed from its summit; but the weather was not clear enough while we were there although there was no rain after the first day and we were able to get many glimpses of the beautiful, fertile plains of Sichuan far below.

Next Month Nanjing

Dr. Croat Receives Grant

Dr. Thomas B. Croat, P. A. Schulze Curator of Botany, has received a National Science Foundation grant of $171,000 for a continuation of his revisionary work with the genus *Anthurium*. This work will be performed principally in South America. Dr. Croat is currently on a three-month trip in western South America, where he will be collecting in Colombia, Ecuador, Peru and Bolivia. This study will involve the "bird's nest" *Anthuria,* so called because of the rosette arrangement of their unusually long, more-or-less erect leaves that hold debris which is a source of nutrients for the plants, whose roots often grow up into the rosette. Dr. Croat will be sending back live material of the aroid family to add to his research collection, which currently numbers approximately 3,000 plants, and is already one of the finest collections of aroids in the world.

The Climatron...

(Continued from Page 1)

In 1976, in a Bicentennial survey of the A.I.A., the Climatron was named as one of the most significant architectural achievements of the first 200 years of American history.

The mechanical and electrical systems of the Climatron were designed by Paul Londe and Associates. For their work on these systems, the firm received the Actual Specifying Engineers First Place Award in 1964. Londe and Associates also worked on the geodesic dome which was the visitor center at the Montreal World's Fair, *Expo '67*. In designing the systems for that center, Londe used the Climatron as a laboratory to solve the various problems involved in the design of the *Expo '67* dome, specifically those problems pertaining to human comfort, use of solar heat gain, and heating and cooling.

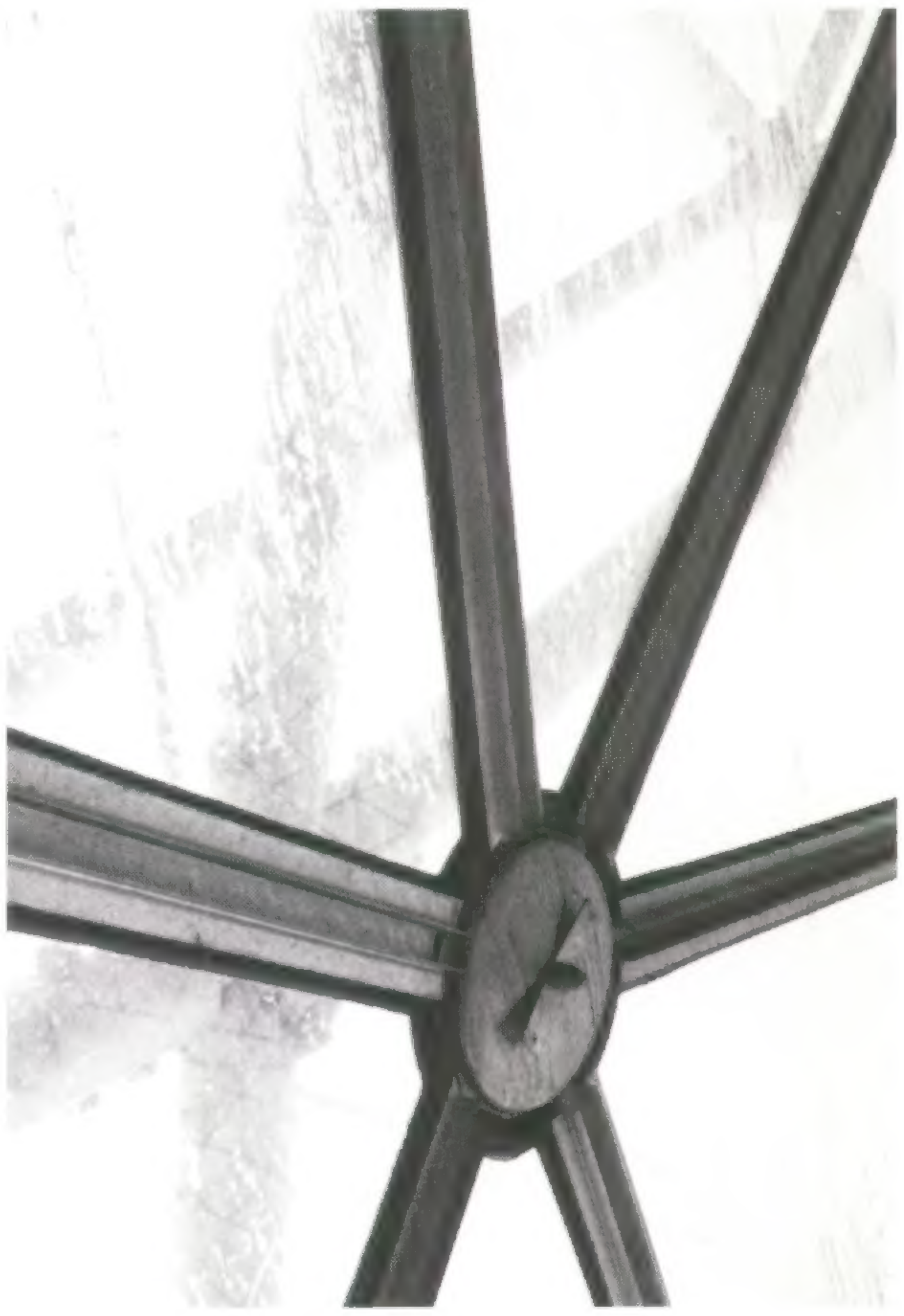
Aside from being a structure of architectural innovation, Went saw the Climatron serving another, more important function. He envisioned it as a laboratory for scientists. As he wrote in his diary, ". . . it should be possible with our air-conditioned greenhouses to study the distribution of temperature and photoperiod response in the plant kingdom." The reader should note the plural *greenhouses*. At that time (1959) it was the plan to build several smaller domes which would be as "satellites" adjacent to the largest and first dome-greenhouse, the Climatron.

As Harry Richman recalls, ". . . the design was basically for the plants and a plant laboratory and not for people. Whenever there was a decision . . . to be made in the design, if it worked [well] with the growth of the plants and didn't disturb the laboratory that Went wanted . . . that was the route we went." The Climatron was an adaptation of principles Went had previously used in his development of the Phytotron — a comprehensive set of air-conditioned growing rooms (growth chambers) for plants. These principles were first applied to the Earhart Laboratory at the California Institute of Technology. In fact, Went thought that the Climatron would attract as many visitors as the Earhart lab did.

To date, approximately 6,000,000 persons have visited the Climatron.

In the twenty years since the Climatron was opened, its role has been redefined. Rather than a laboratory, the Garden has found that it serves best as a display house of tropical plants. Because of the temperature gradient — although the gradient is not as precise as Went desired — visitors can see plants from several different tropical regions in the Climatron, and because of the dome structure, can observe them in a setting that is close to a natural one. There are no pillars or beams to obstruct sight, as there would be in a traditional greenhouse. The dome, too, gives the effect of a panorama; a suggestion that one is not within a building, but outside.

Bill Wagner, Supervisor of Display Greenhouses suggests another reason for the success of the Climatron as a tropical display. "99% of the plants [in it] are grown in soil rather than pots, and are planted as near as possible to the way they are found in their native habitats."



The Climatron is also a valuable educational resource, as are botanical gardens in general. Botanical gardens make it possible for people-not-scientists to observe the variety and richness of the ecosystems which occur on earth. The Climatron, with its approximately 1,700 species, allows its visitors to gain a notion of the diversity of tropical plants, including the important economic plants, coffee, banana, papaya, and the ornamental pieces, such as orchids.

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Comment-

(On October 27, 1980, Dr. Raven presented the keynote address to the triennial meeting of the International Council of Museums, in Mexico City.

James Hester, President of the New York Botanical Garden, addressed the Henry Shaw Associates at their annual dinner on November 13, 1980.

We publish excerpts from them, below. Because they are on similar topics, we present them as dialogue, although they were delivered several weeks apart, and in cities two-thousand miles from one another. We have indicated those excerpts from Dr. Raven's address by italics. Those from Dr. Hester are in standard typeface. — Editor)

It is particularly fitting that this address should be made here at the Missouri Botanical Garden. Not only is this the senior garden in America but it and the New York Botanical Garden are very closely related . . . These two institutions share major responsibility for one of the most important botanical tasks of our time: the identification and conservation of as much as possible of the remaining flora of the rapidly disappearing rain forests of tropical America.

* * *

Current estimates agree that within a few decades all of the remaining tropical forests will have been seriously altered or converted to other forms. Since most kinds of plants, animals, and microorganisms are unable to reproduce outside of the communities in which they occur naturally, it follows that very large numbers of organisms will become extinct in the very near future. Of the estimated three million kinds of tropical organisms, perhaps as many as a third – a million species, of which roughly three-quarters have not yet been given a name – are likely to become extinct during the next thirty years. ***This amounts to the extinction of a quarter of the diversity of life on earth during the lifetime of a majority of those people who are alive today.*** *Very simply, this means that the scientists concerned with museum collections, are, in effect, confronted with an opportunity equivalent to having a few decades to study living dinosaurs, or life on an inhabited but hitherto unknown planet.*

* * *

The principal difficulty that confronts our basic scientific mission is that despite the dependence of sound ecological and conservation research and economic botany on basic taxonomy, the role of systematic taxonomic research is not now highly appreciated either in the academic community or in Washington. Botany is given a low priority in the academic community because of fascination with molecular biology. The same holds true in government funding agencies. National Science Foundation funding for systematic biology has not even kept up to current double-digit levels of inflation in the past few years. For example, in 1978 the allocation was 7.4 million dollars. In 1979 this rose only 2.7% to 7.6 million dollars. The current year's budget represents an increase of 4% over last year, to 7.9 million dollars. Thus, funding for systematic biology has actually decreased through the effects of inflation, just at the time when we are starting to understand the importance of this kind of research, especially as it includes the tropics.

* * *

Most tropical ecosystems are fragile, and when they are treated as resources to be exploited at will, the soils on which they grow often deteriorate seriously.

* * *

It seems to me that botanical gardens like yours and ours provide one of the most effective opportunities possible for fighting back against conditions of modern life that disrupt the relationship between human beings and the natural environment. I am sure many of you agree that the relationship between plants and man is vitally important to our mental, psychological, and spirtual health. The importance of plants to man is obviously ignored by some who have other priorities. Those of us who appreciate and understand the importance of plants to human existence are fortunate that institutions like our botanical gardens exist and that because they are private institutions they give individual citizens substantial opportunities to affect what is done about the relationship between plants and man in our society.

* * *

We live in an age when the world's natural heritage is rapidly being reduced in scope and diversity. This awesome fact in itself confers an enormous responsibility upon the world's scientific community and especially upon those responsible for the museums in which systematic collections of plants, animals, and microorganisms are preserved.

* * *

Modern technology is wonderful. We depend on it, and most of us want even more of the conveniences it provides. But the conditions of our cities and suburbs, more often than not, are offensive to basic human instincts that seek identity with nature that cannot be achieved amidst the jarring noises and physical intrusions of modern urban life. There have been studies of this instinct that confirm what we already know; that we all deeply desire to live surrounded by trees, shrubs and flowers; that most people feel a strong personal bond with plants.

* * *

In a world where so much of the natural landscape is being altered so rapidly and simultaneously, it is absolutely necessary to be able to select efficiently those areas that could best be set aside so as to preserve the maximum number of kinds of living organisms. The more developed countries of the world would need to show a willingness that has thus far been lacking to compensate less developed countries for setting aside segments of our common natural heritage.

* * *

No one here needs to be reminded of the significance today of issues concerning the environment, conservation, or the possibilities of greater use of plants for energy, food, fibre, or medicine. What many people do not realize is that these issues cannot be resolved without the basic knowledge of plants that is obtained from our field expeditions and the systematic analysis and description of plants made possible by our herbaria, libraries and laboratories.

* * *

Regardless of whether those who are alive today realize the importance of current conditions or not, we live at a time when the sum total of organic diversity is being dramatically decreased. The life-support systems that sustain us are made up of the totality of this diversity, and the kind of assault on it in which we are now collectively engaged, and which can be modified, but not halted, should be of concern to every citizen of every country.

From The Members' Office

Tired of Winter? Join Garden Members in...

Baja California — January 24-February 4, 1981. Ken Peck, Manager of Instructional Services and tour escort says, "This trip is geared for those who are interested in seeing unusual desert vegetation and experiencing the history of a culture through contacts with its people, missions and settlements. The timing of this trip should find temperatures quite pleasant."

This tour will provide an opportunity to see an unequalled variety of desert flora and spectacular panoramas unique to this peninsula.

Hawaii — March 21-April 4, 1981. Visit private gardens and estates escorted by Steve Frowine, Chairman of Indoor Horticulture. Among other places this tour will take you to a Dendrobium Orchid Farm and the Carlsmith and Roth Estates on Hilo, The Kula Botanical Garden and an incredible protea collection on the island of Maui, the incomparable garden of Mr. John Allerton on Kauai, and the Waimea and Lyon Arboreta and Foster Garden in Honolulu — plus much more!

On Wednesday, January 7, 1981 at 7:30 p.m. in the Auditorium of the John S. Lehmann Building, Steve Frowine will present a slide presentation featuring many of the sights included in the Hawaiian tour. Members are invited to attend and guests are welcome. If you can't join us on the tour, at least join us on January 7, 1981.

If you'd like additional information, including a detailed itinerary of either tour, please call the Members' Office, 577-5118.

Letter From the Members' Office

1980 has seen the number of memberships in Missouri Botanical Garden increase by almost 10% — making our Membership one of the largest of any cultural institution in the area and the largest of any botanical garden in the world.

Credit for the success of our program must go to our Members. It is you who have introduced the Garden to your friends and families and who have "spread the word" about Garden activities and programs. A special thank you goes to the many of you who recently gave holiday gift memberships — a wonderful way to share the Garden with others.

The decade of the '80's will be a challenging one, but we are convinced that with your support, our Membership will continue to grow and the Garden will continue in its tradition of commitment to the community and to the future of the environment.

Revision Of Membership Benefits

As stated in the November/December *Bulletin,* Supporting Members, those who make an annual Membership contribution greater than the minimum of $25 as a way of sustaining the Garden and supporting its programs, will be provided special benefits. In appreciation of their gift, they will receive guest privileges. A Supporting Member may bring any number of guests to the Garden, throughout the year, free of charge.

Beginning January 1, 1981, Supporting Members may stop at the Visitor's Entrance, 2101 Tower Grove Avenue, and upon showing their card, will be issued a special decal to place on their card which will designate that they are entitled to guest privileges. During the course of 1981 when they renew their Membership, they will receive a new *Supporting Member* card.

Organizational Membership Category Established

The Executive Board of the Members has established an Organizational Membership category to provide benefits suited to the needs of clubs, groups and other organizations. A minimum of $25.00 entitles an organization to:

- a guided tour, once a year, with a choice of
  - General Grounds Tour
  - Japanese Garden Tour
  - Tour of Tower Grove House
  - Library/Herbarium Tour
- A subscription to the Missouri Botanical Garden *Bulletin* which includes horticultural information written specifically for the St. Louis area and listings of activities and events of interest.
- Notification of Lecture Series
- A representative of the Speakers' Bureau will present a program about the Garden to the organizations.

No Membership card will be issued. Instead, organizations will receive a letter acknowledging their Membership contribution, outlining the benefits including the details of how to schedule a tour and/or a program.

Individuals are encouraged to become Members and enjoy added benefits not available to organizations.

For further information, contact the Members' Office at 577-5118.

— Lise Barr, Executive Secretary,
Office of the Members

Mr. and Mrs. Robert R. Hermann and Mr. C. C. Johnson Spink (R) at Henry Shaw Associates' Dinner. The dinner was held on November 13, 1980, at the St. Louis Club, to honor the Henry Shaw Associate Members who provide leadership in support of the Garden.

Anne Lehmann And Wayne Kennedy Honored At Shaw Associates Dinner

Board President, Tom K. Smith (L); Shaw Medal recipient, Anne L. Lehmann; and Greensfelder Award recipient, Wayne C. Kennedy, at Shaw Associates Dinner.

Anne L. Lehmann, a long-time supporter of the Garden, and Wayne C. Kennedy, director of St. Louis County Parks, were honored at the annual Henry Shaw Associates Dinner, held on Thursday, November 13, at the St. Louis Club.

Mrs. Lehmann received the Henry Shaw Medal, an award which the Garden initiated in 1933 to pay tribute to individuals who have made significant contributions to the Garden, or to botany or horticulture. Previous recipients include Dr. Julian Steyermark, author of the *Flora of Missouri,* in 1979, and Roberto Incer Barquero, president of the Banco Central de Nicaragua, in 1978. Mrs. Lehmann is only the fourth person to be given the Shaw Medal in its forty-seven year history; she is the first woman to be so honored.

She is the widow of John S. Lehmann, who served as president of the Garden Board of Trustees from 1953-57. The Lehmann Building, in which the Garden's library, herbarium and educational facilities are housed, is named for him. Anne Lehmann was a co-founder of the Women's Executive Committee, and was instrumental in the restoration of Tower Grove House, the 131 year old country home of Garden founder, Henry Shaw. In 1972 she was named a St. Louis *Globe-Democrat* Woman of Achievement in the category of Creative Philanthropy. The Anne L. Lehmann Rose Garden is named for her.

Wayne C. Kennedy was presented with the first Albert P. and Blanche Y. Greensfelder Award for work in St. Louis beautification. The Greensfelder Award was established through the Albert P. and Blanche Y. Greensfelder Fund, and will be presented periodically to individuals who have made significant contributions to landscape, garden and park planning, and designing for urban improvements.

When Mr. Kennedy was named director of the county park system in 1962, there were only four parks covering a total of 400 acres. Today, there are 70 encompassing over 12,000 acres. He was able to acquire much of the land for the county through the use of donations and without expending county funds. The parks opened under his direction include Queeney, Greensfelder and Laumier.

In 1961, he was the recipient of the A.M.F. Award for the best promotion of recreation in the United States. That award was presented by then President John F. Kennedy.

Shaw Arboretum

Shaw Arboretum is open through the winter, and when the snow falls, head for Gray Summit to enjoy the 10 miles of snow-covered trails and service roads. Come early and break through virgin snow, or come later and follow the paths opened by other skiers. The Pinetum is extremely beautiful when the conifers are covered with a white mantel and the trees stand rigidly against the deep blue winter sky.

Bring your own equipment; the Arboretum does not give lessons. Members are admitted free, and the charge for non-members is still only one dollar. During the week the Visitor Center and bathrooms will be closed, but on weekends when it snows, the Visitor Center will be open for your convenience. Also, you can make special arrangements for your group, including renting the Trail House with its Franklin Stove.

Call 577-5138 for information about facilities and fees.

Calendar

Through Jan. 15
Post Holiday Sale
Garden Gate Shop

Jan. 7
Hawaii Lecture
Lehmann Auditorium
7:30 p.m.
Steve Frowine

Jan. 10-Feb. 1
Food Plant Exhibit
Mediterranean House

Jan. 14
"A Botanical Journey to China"
Lecture Lehmann Auditorium
10:30 a.m. and 8:00 p.m.
Peter H. and Tamra E. Raven

Feb. 6
Orchid Show
Members' Preview Party

Feb. 7-Mar. 8
Orchid Show
Climatron

Feb. 14 & 15.
Orchid Cultivation Demonstration
Plant Shop

Feb. 28 & Mar. 1
African Violet Society Show
Lehmann Building

Mark your calendar now
Mar. 14
Spring Flower Show opens

Orchids

Orchids comprise the largest plant family in the world. Over 30,000 species and even more hybrids represent this impressive family which is spread from tropical lands to Antarctica. The vast numbers of orchid varieties give at least a hint of the incredible diversity of flower shape, size, and color which this family offers the indoor gardener.

As can be expected with such a huge group of plants, the cultural requirements do vary, but we can establish some general guidelines.

Orchids are divided into three categories depending on their temperature requirements:

Cool: Night temperature: 50-55°F. Day temperature: 60-70°F. Examples: Cymbidiums, Odontoglossums, some Paphiopedilums

Intermediate: Night temperature: 55-60°F. Day temperature: 68-75°F. Examples, Cattleyas, Eendrobiums, some Paphiopedilums

Warm: Night temperature: 60-65°F. Day temperature: 70-85°F. Examples: Vandas, Ascocendas, Phalaenopsis, some Paphiopedilums.

The intermediate and warm categories are easiest to maintain in most homes.

With all green plants light is a critical element in growth. Orchids are commonly divided into three categories depending on their light requirements:

High Light Intensity
(1,500 to 3,000 foot-candles)
Vandas, Renantheras, Angraecums

Medium Light Intensity
(1,500 to 3,000 foot-candles
Cattleyas, Miltonias, Ascocendas, Cymbidiums, Oncidiums, Odontoglossums.

Low Light Intensity
(less than 1,500 foot-candles)
Phalaenopsis, Paphiopedilums, Jewel Orchids (many different kinds).

Orchids in the high light intensity category are not usually grown in the home. Those in the medium light category will do fine in a south or southeast window; those in the low light will do well in an east window. In some cases, if the afternoon temperatures on the window sill begin to soar, it might be necessary to lightly shade your plants with a sheer curtain.

If you live in an apartment on the north side of the building, do not despair. Growing orchids under artificial light is simple; in my opinion it is easier and in many ways superior to growing plants on a window sill. When growing orchids under lights you can grow them in any space available — in the basement, closet or under the sink — and you can provide exactly the amount of light which they require. A four-foot, four-tube flourescent fixture will provide enough light to grow those plants in the middle and low-light intensity category. Medium-light plants like the Cattleyas and Miltonias should be placed under the center area of the tubes and those in the low-light category, like Phalaenopsis and Papiopedilums, should be put on the sides and ends of the tubes. I would recommend using a 50:50 combination of warm-white and cool-white or cool-white and wide-spectrum growth florescent tubes. The medium-light plants should be placed so that the tips of the leaves are just a few inches from the tubes; those plants in the low-light category can be placed 6" to 12" away. If you are determined to grow those plants in the high-light category, it can be done by using special very high output fluorescent tubes.

Proper humidity is important for all houseplants: 50-70% is ideal. To maintain this humidity level in the home it will be necessary to sink the potted orchids in damp sphagnum moss, grow the potted plants on damp pebbles, or use a room or area humidifier. For a small growing room, an inexpensive cool-mist vaporizer is an ideal solution. Misting the plants is frequently recommended as a means of increasing relative humidity, but this is seldom effective.

In most homes the normal convection of air currents will provide adequate air circulation. If the air does seem stagnant, a small fan can quickly solve this problem.

Watering is an art that many beginners have difficulty learning. Orchids with pseudobulbs (thickened stems), which serve as water storage organs, naturally do not need as frequent watering as those without these structures. Plants with pseudobulbs should be allowed to dry off thoroughly between waterings. This will usually mean watering once every 5 to 7 days in the spring and summer, and once every 10 to 14 days in the fall and winter. Epiphytic orchids (ones that naturally grow on trees), such as Phalaenopsis, which do not have pseudobulbs, usually need to be watered about once every 3 to 5 days in the spring and summer, and every 6 to 9 days in the fall and winter. Terrestrials (orchids which grow on the ground in soil), such as Paphiopedilums, should never be allowed to completely dry out. The Plant Shop sells different potting materials which are appropriate for the various types of orchids.

There are many different opinions regarding the fertilization of orchids. If you are growing your orchids in bark, a fertilizer high in nitrogen such as Peter's 30-10-10 is recommended. Some growers like to fertilize their orchids once every several weeks with a water soluble fertilizer. I have successfully used a slow release material called Osmocote, which I apply only once a year, every time I repot the plants. Although it has been reported by some that this material can burn the roots of orchids, I have not found this to be the case with my plants.

Fortunately, orchids are relatively pest-free. Prevention is the key word in disease control. To prevent disease, carefully wash your pots in a special disinfectant like Physan or a 1:9 solution of chlorox and water, and be careful to buy clean, disease-free plants. Most diseases like leaf spots and crown rots can be controlled with Physan or benomyl. Insects like aphids and mealybugs can also be controlled with Physan or benomyl. Insects like aphids and mealybugs can be controlled with malathion or Orthene; mites can be killed with kelthane. If you notice snails, you can use Zectran or Mesurol for control.

— Steven A. Frowine
Chairman, Indoor Horticulture

William E. Maritz Named A Trustee

Board Chairman Tom K. Smith announced that William E. Maritz, president of Maritz, Inc., and chairman of the board of Laclede's Landing Redevelopment Corp., has been elected a member of the Garden's Board of Trustees.

Mr. Maritz, a St. Louis native, is president of Maritz, Inc., one of the largest and most successful sales and production motivation firms in the nation. He is a graduate of the Woodrow Wilson School of Public and International Affairs at Princeton University and serves currently on the boards of directors of a variety of local or national institutions, including Princeton University, the American Youth Foundation, the Camping and Education Foundation, the Cystic Fibrosis Association, the Boy Scouts of America and the Regional Commerce and Growth Association.

He replaces Mr. A. Timon Primm, retired executive vice-president and business manager for the Pulitzer Publishing Co., who is leaving the Garden Board after 16 years. During his board tenure, Mr. Primm worked principally on environmental and conservation issues, and was instrumental in the 1970 expansion of the Shaw Arboretum, Gray Summit, MO., to its current size of 2,400 acres. He was named an Honorary Trustee in appreciation of his contributions to the Garden.

Mediterranean Food Plants Exhibit

Often, the richness of a food extends beyond its taste and substance. There are foods which symbolized, for the people of cultures of several millenia ago, life, death, peace and fertility. Others figured prominately into the myths which explained the seasons; which gave meaning to an almost incomprehensible world and universe. This is especially true of certain food plants which are found in the five Mediterranean regions of the world.

The pomegranate, not the apple, is considered by some to be the fruit of the "tree of knowledge" which, when consumed, caused Adam and Eve to be banished from Eden. That same fruit was the indirect cause of winter, according to the ancient Greeks. Persephone, who was the daughter of Demeter, goddess of the earth, was kidnapped by Pluto and carried off to his kingdom of the dead. Through the intercession of Zeus, Persephone was returned to her mother. But since she had eaten food — a single pomegranate — while she was with Pluto, she was compelled to return to him once a year, for three months. During those months, Demeter grieves and the earth is barren, since she does not tend it; we have winter.

The consequences of our eating the pomegranate are not severe, as they were for Adam, Eve and Persephone. On the contrary, the fruit is a rich one, the meat, seeds and juice of which can be enjoyed.

The first sherbet was made by combining the juice of the pomegranate with snow.

Another food plant of the Mediterranean, the olive, is the symbol for peace. It was an olive branch that the dove brought back to Noah, giving him the sign that the deluge waters were receding and that land was beginning to appear once more in the world. In parts of Italy, some people still hang an olive branch over their doors to keep evil away.

The fruit of the olive can be eaten in all stages of ripening, from green to black, which is the color of the ripe olive.

Some growers cultivate olive trees only for olive oil, which is pressed from the fruit. Approximately one million tons are produced each year, with one hundred pounds of the fruit yielding about thirteen to fourteen pounds of oil. The finest quality oil is cold-pressed from ripe fruit; it is practically odorless. To determine the quality of the oil, pour a few drops into your palm and rub both palms together. Smell the aroma in your cupped hands. The stronger the odor, the less pure the oil.

The olive and the pomegranate, as well as the grape and the fig will be among approximately forty plants featured in the Food Plant Exhibit in the Garden's Mediterranean House from January 10 to February 1, 1981. There is no charge for admission to the show, over the usual fee to enter the Garden. Members of course are admitted free.

Botanist Proposes Antarctic Gene Bank

In mid-October, Dr. Boguslaw Molski, Director of the Botanic Garden of the Polish Academy of Sciences in Warsaw, visited the Garden. He was visiting botanical institutions in the United States in conjunction with a project he has proposed to establish a plant gene bank in the Antarctic. His reasons for constructing a gene bank there were two. First, the Antarctic is a continent which falls under the governance of no single country, and therefore any scientific installation there would be accessible to scientists of all nations with no bureaucratic interference. Second, gene banks which now exist are dependent on sources of electricity to maintain temperatures cool enough to preserve the seeds held within the banks. Because energy has become such a costly commodity, Dr. Molski sought a location in which the amount of energy required was minimal. The temperatures in the Antarctic are low enough to preserve seeds with no additional energy expense necessary. The gene bank would be located on King George Island, South Shetlands, The Antarctic.

The King George Island facility where the gene bank would be located.

The Garden In Winter

If, by the time you're reading this, you're tired of the grey, cold and snowy days of winter, there are a few suggestions of places you might visit in the Garden to forget, for an hour or two, the unkind weather.

Outside, the Japanese Garden is beautiful, especially in the snow. It was designed with consideration of the Japanese tradition of snow-as-flower. The English Woodland Garden is serene under a white mantle.

Inside, the four display greenhouses are not only warm, but also pleasing. In the Linnaean House, the oldest operating greenhouse west of the Allegheny Mountains, camellias bloom in late January and in February. The house will be especially nice this winter because of recently completed renovation.

From February 7 to March 8, the Orchid Show comes to the Climatron; we will celebrate the Climatron's twentieth anniversary concurrently with the show. The Mediterranean House, where you will find the Food Plant Exhibit from January 10 to February 1, is at its peak during the early winter; that is whem most of its plants are in bloom. And the Desert House — well, in the midst of cacti, it becomes difficult to remember that outside it is ten degrees and snowing.

Special, heated trams run during the winter, so it is possible to tour the grounds and keep warm simultaneously.

Also, snow is removed quickly and efficiently from the parking lots and all Garden paths, so that our visitors can enjoy the Garden and not be troubled by the white stuff that we all get so tired of, so quickly.

Post-Holiday Sale

The Garden Gate Shop's post-holiday sale, which began on December 26, will continue during January, until the 15th. Decorations and gift items are being offered to members at special, reduced prices.

Tower Grove House will be closed for two months, from Monday, January 5, 1981, through Saturday, February 28, 1981, for housecleaning and refurbishing. It will reopen for visitors on Sunday, March 1, 1981.

Plant Shop: Winter Flowers

During January and February, The Plant Shop will have camellias in bloom at the same time these flowers are blooming in the Linnaean House.

Also, in conjunction with the Orchid Show, The Plant Shop will feature an excellent assortment of orchids, in all price ranges. According to Debbie Colombo, manager of the shop, "Some people think that orchids are difficult to grow, but really, anyone who has had success with ordinary house plants should be able to grow orchids. We'll have several species that are fairly easy to care for, including *Phalaenopsis* (moth orchid) and *Paphiopedilum* (lady slippers). And we always have plant-care sheets for every plant we sell." The plant-care sheets are available at no cost, on request, with every purchase in the shop.

Most of the orchids will be either in bud or in bloom. Young plants will also be available.

China Lecture Scheduled

Peter and Tamra Raven will present a lecture "A Botanical Journey to China," describing their recent trip to the Peoples Republic of China, on Wednesday, January 14, 1981, in the Lehmann Building Auditorium at 10:30 a.m., and 8:00 p.m. The program is open to all members and their guests.

Orchid Show

The annual Orchid Show will come to the Climatron on February 7, 1981, and will continue until March 8. On February 14 and 15, there will be orchid cultivation demonstrations. Garden Members are invited to visit the Orchid Show, and the Climatron during our celebration of its twentieth anniversary.

Shaw, Engelmann Papers

Inventories of the Henry Shaw and George Engelmann Papers, a task which has been in progress for the past year, under the auspices of the National Historic and Public Records Commission, is now complete. The inventories, and access to the Shaw and Engelmann Papers through them, are now available to qualified researchers and scholars. Application should be made through the Garden library.

Rosalie Hinch Named To New Garden Post

Dr. Raven announced that Rosalie Hinch, a former Famous-Barr advertising executive, has been named an Assistant Director for the Garden. She will direct the newly established Division of Marketing.

"The establishment of this division represents a new direction for us," he said. "It is an indication of our ongoing commitment to community service and our intentions to provide new programs and new services to the people of the St. Louis area."

The new division will include the Publications and Special Events Departments, and the Plant Shop, Garden Gate Shop and Greenery Restaurant.

"It's a reorganization as well as a new direction," said Dr. Raven. "We hope it will help us to be more efficient in meeting the changing needs of our constituency. And we feel fortunate to have found an individual of Ms. Hinch's experience and ability to direct the new division."

Ms. Hinch, who holds a bachelor of journalism degree from the University of Missouri-Columbia, has also served as reporter and feature writer for the Baton Rouge (LA) *Morning Advocate* and as assistant director of publicity, Baton Rouge Department of Public Works.

Education Department Planning Spring Programs

Several new programs will be offered by the Education Department in its spring schedule of classes. According to Judy Studer, Chairman of the Education Department, "We want to make courses available that will help people in their own gardening, whether they grow vegetables in large, backyard plots, or in just a few pots on a sun porch. The emphasis will be on the practical. Where do you plant an azalea? What about using ground covers instead of grass? That sort of thing. We're considering courses in home landscaping, fruit trees, decorating with plants, and the operation of small greenhouses. We're very excited about the possibility of offering some of these to the community."

The final schedule of programs will be announced in early February. For further information, call 577-5140.

America's Best! Botanical Garden

C. Paul Luongo, in his book *America's Best! 100* (Sterling Publishing Co., 1980) designates the Missouri Botanical Garden as the best botanical garden in the country. The entry, appearing on page 38, describes the facets of the Garden which caused him to select it, including the Japanese Garden, the Climatron, the rose gardens, Tower Grove House, and the Linnaean House. He also commends the Garden for its scientific work.

Walter Thompson

Walter Thompson, volunteer in the library archives, died October 14, 1980.

He had worked in the Corps of Engineers library after leaving the service, gaining knowledge which was invaluable in his work with the Garden's biographical files.

His quality of "mother wit", as another volunteer called it, as well as his quiet meticulous work, will be missed by all at the library.

STATEMENT OF OWNERSHIP, MANAGEMENT AND CIRCULATION (Required by 39 U.S.C. 3685).

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I certify that the statement made by me above is correct and complete.

(Signed) Joseph M. Schuster, Editor
Manager of Publications

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In Honor of Mr. and Mrs. Joseph H. Bascom's 40th Wedding Anniversary
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In Honor of Mr. and Mrs. J. O. Kramer's First Granddaughter
Dorothy and Sam Rosenbloom

In Honor of Mr. and Mrs. Loren LaMore's 50th Wedding Anniversary
Mrs. Robert C. Bleikamp

In Honor of Mr. and Mrs. Albert H. LeRoy's 50th Wedding Anniversary
Milton L. Daugherty

In Honor of Mrs. Francis Mesker
Paul and Eleanor Ring

In Honor of the Birth of Mr. and Mrs. M. D. Manesberg's New Granddaughter and Grandson
Dorothy and Sam Rosenbloom

In Honor of Mr. and Mrs. O. W. Rash, III's Anniversary
Mr./Mrs. Carl Kottmeier

In Appreciation of Tamra Engelhorn Raven
St. Louis Woman's Club

In Honor of Mr. and Mrs. S. I. Rothschild's 40th Wedding Anniversary
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In Honor of Mr. and Mrs. Don Samuels' Special Anniversary
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Claybreakers Garden Club

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Seasons Greetings to
Mr. and Mrs. Howard Swanson
Dr./Mrs. Ben H. Senturia

Seasons Greetings to
Mr. and Mrs. Edward Prince
Dr./Mrs. Ben H. Senturia

"Thank you very much for taking the time to show us the Japanese Garden. It is the most impressive Japanese garden I have ever seen outside of Japan. I wish to commend you most sincerely for this achievement." – from a letter to Dr. Raven from Yoshio Okawara, Ambassador of Japan.

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9,981 Years In a Garden

"There is no ancient gentleman but gardeners.... they hold up Adam's profession."
—Shakespeare
Hamlet, Act V, Scene 1

If we are to accept certain implications of *Genesis,* then it appears that the first garden (Eden) required no tending and that the only labor required of our first ancestors was to pick the fruit, nuts and vegetables and eat them, according to their whim.

Since that time, however, man has had to exert some amount of energy to bring forth even a small crop. As Charles Dudley Warner says, in *My Summer in a Garden,* "What a man needs in gardening is a cast-iron back, with a hinge in it."

The origins of gardening are found in agriculture, with the earliest cultivators of food found near Jericho in Palestine about 8,000 B.C. These earliest gardens were strictly utilitarian, and it wasn't until about the fifteenth century B.C. in Egypt that people began making gardens decorative in design.

It is a common theory that the roots of agriculture lie in a time of severe famine; that a community of early men could not depend on the capricious yield of the earth for their food and so began a systematic cultivation of food plants to ensure their survival. Others dispute this theory, claiming that faced with the peril of starvation men would not have had sufficient time or determination to develop techniques of cultivation which would yield the food necessary for their survival. They propose that cultivation and agriculture rose out of deliberate, methodical experiments.

But, whether it was a desperate measure or a carefully developed science, agriculture arose and was one of the principal contributors to the establishment of civilization, since once man had the ability to cultivate the earth, stable societies were able to form. Whereas hunter-gatherer tribes were nomadic, moving with the sources of food, agricultural communities could remain in one place since they controlled, to some degree, their food supplies. Too, individuals co-operated in the cultivation and so formed societies based on this co-operation.

This early cultivation was limited principally to food crops which were easy to grow, edible roots and some fruits; plants which could be cultivated using the simplest of tools—digging and picking implements made of animal bone.

Later, medicinal herbs were cultivated, with a herbal record appearing in Sumer (Iraq, today) about the third millennium B.C. These herbs required watering, and it was the Sumerians who developed irrigation.

Once communities had moved beyond subsistence level, they could begin growing plants for qualities other than food value.

Besides Egypt, the ancient Greeks, Romans and Chinese contributed much to the art of decorative gardening. The Hanging Gardens of Babylon (Sumer), one of the "seven wonders of the ancient world" were constructed between the late-sixth and early-ninth century, B.C.

Plants were so much a part of the lives of Romans that they were the first to make gardens an essential extension of their homes. Many apartment dwellers, owning no land,

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Tax District Support

The League of Women Voters of Metropolitan St. Louis will support the effort of the Missouri Botanical Garden to become a sub-district of the Zoo-Museum Taxing District so that the Garden will be able to receive public funds from the property tax. The League reached this support position after a comprehensive study of the Zoo-Museum Taxing District and member discussion of the issues pertinent to the future of the District. The League considers the Missouri Botanical Garden an important cultural asset to the community and deserving of public financial support.

Comment

I am pleased to say that work is progressing well on the new Visitor Center at the Garden's north end. McCarthy Brothers, the contractor for the project, reports that the Center should be completed by the end of the year. Later in this *Bulletin* are details on the project, including a description of the features currently under contract for construction.

I am also happy to report that the Garden received a major challenge grant from the National Endowment for the Arts, becoming the first botanical institution to receive such a grant.

It is the purpose of challenge grants to motivate institutions such as ours to raise additional funds to meet the grants. The N.E.A. grant is a one to four match, for capital funds raised in 1981. That is, for each four dollars we receive this year from other sources, they will match with one dollar. Our goal then, to meet their challenge, is $1.4 million.

We are grateful that the N.E.A. has acknowledged, in such a concrete manner, the important work conducted here in horticulture, education and botany. It is only through such generous help that we can maintain and continue our vital functions.

The history and progress of the Garden are inseparably bound with the generosity of its many benefactors, large and small, and I would like to thank all those who have contributed to the Garden. I want also to thank, in advance, all who, through their gifts and pledges to the Capital Fund during the year, will enable us to reach our goal motivated by this N.E.A. challenge grant.

Peter H. Raven

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Letter From China—Conclusion

From Shanghai we departed on September 2 by train for Nanjing, Sister City of St. Louis. Building on a relationship that began even before Nanjing and St. Louis became sister cities, the Sun Yat-sen Memorial Botanical Garden in Nanjing and the Missouri Botanical Garden have established a close, working relationship. The assistant director of the Nanjing Botanical Garden, Professor Sheng Cheng-kui, visited St. Louis as a member of the Chinese Botanical Delegation in 1979, and was very impressed with our facilities at the Garden and Arboretum. When our train arrived in Nanjing we were greeted by Professor Sheng and by the director of the institute, Professor Shan Jen-hua, who completed his Ph.D. at the University of California in Berkeley in 1949, just a few years before I arrived in the same department. Professor Shan, Sheng, and their entire staff were exceedingly hospitable during our stay in Nanjing. In our orientation sessions at the Botanical Garden, they presented us with a beautifully prepared volume that contained newspaper articles from both Chinese and American papers celebrating the establishment of the Sister City relationship between Nanjing and St. Louis, photographs of plants taken in both gardens, as well as botanical literature for our library. The commemorative volume will be a treasured memento in the archives of the Missouri Botanical Garden.

Professor Chen Shu-liang (left), Professor Shan, Dr. Raven, and Professor Sheng (in front of Dr. Raven), examining specimens in the herbarium at Nanjing.

We have been exchanging seeds of plants with the Nanjing Botanical Garden since 1974, and some of them have already proved successful in our Garden. When Professor Sheng was here in 1979 he was particularly pleased to see large specimens of *Zelkova schneideriana,* an attractive small tree in the elm family, growing near the Homeyer Water Basin along the west side of the lake in our Japanese Garden, and also just outside the Administration Building in the area south of the Shoenberg Fountain.

In turn, when we visited Nanjing we were very pleased to see plants of several species of gumweed, *Grindelia,* growing in the experimental fields from seeds that we had obtained for them by correspondence from the western United States. The staff of the Nanjing Botanical Garden were testing these as a possible commercial source of gum.

One of the striking uses we saw was that of a plant of the sunflower family, *Stevia rebauldiana,* which originally came from Paraguay and had been cultivated as an artificial sweetener in Japan. A small taste of a leaf of this plant immediately reveals it as containing high concentrations of an artificial sweetener much more potent than sugar. Obtaining seeds of this plant from Japan, the staff of the Nanjing Botanical Garden has converted it into a commercial crop in Jiangsu Province which, for the first time in 1980 was able to export 12 tons of dried leaves back to Japan. Production should increase considerably in the future.

The climate at Nanjing is much milder than the climate in St. Louis, with temperatures below the 20's extremely rare. At Nanjing, the staff of the botanical garden was much concerned with developing hardy strains of olives, which they had done successfully and which are now being grown as a commercial crop in Jiangsu Province.

Notwithstanding the fact that our climate is much more severe, many of the plants that can be grown in Nanjing will succeed here, and we plan to enlarge and extend our exchange of living material in the future. Seedlings of Missouri oaks and other native trees were in the nurseries at Nanjing, having been grown from material collected by the garden staff and other materials kindly supplied to us by the Missouri Department of Conservation. During the time we were in Nanjing, and elsewhere in China, we were able to collect seeds of a number of interesting plants and to take notes on others which we will obtain in the future from our Chinese colleagues to test in the St. Louis area.

A gate at the tomb of Sun Yat-sen in Nanjing.

In addition to this important exchange of plant material, we are also actively exchanging botanical literature with Nanjing, Kunming, and Beijing, enhancing the Garden's library in this way and insuring that we have a full coverage of Chinese botanical literature for students to use here in St. Louis. We will also exchange herbarium specimens, especially of grasses. We have on our staff a scientist who specializes in this family of plants, the most economically important group of plants in the world: Dr. Gerrit Davidse of our staff and Miss Chen Shu-liang of the staff in Nanjing.

Another exciting area of research being pursued by the staff of the Nanjing Botanical Garden concerns air pollution. One of their departments is concerned with testing plants for resistence to air pollution. They do this principally by two methods: one, by drawing air containing common atmospheric pollutants through cabinets and noting the reactions of plants exposed to the air. Second, in cooperation with the various utilities found in the Nanjing area, by con-

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9,981 Years In a Garden

(continued from page 1)

grew plants on window ledges and roofs, as do urban residents in our time.

The Romans, however, did not originate the cultivation of plants in containers, as there is evidence of plants grown in pots in Egypt as early as the twenty-first century B.C. In fact, the Romans appear not to have been innovators in gardening, but were important because of their adaptation and development of techniques learned from other societies.

As men became more experienced, over the millenia, in the cultivation of plants, they were able to devise techniques which would ensure greater success in raising plants.

Theophrastus, who is called "Father of Botany" and who was a contemporary of Aristotle—in fact, Aristotle bequeathed his garden to Theophrastus—set forth several practical cultivation techniques. He saw the need for the presowing treatment of seeds, suggesting soaking cucumber seeds in milk or water for quicker germination, and was also the first to write of starting plants from cuttings. He also understood that manure had a warming effect on soil; he claimed that by spreading it over land, a gardener would gain a twenty-day start compared with ground not covered by manure. The use of manure as fertilizer was first recorded about 3,000 B.C. in Egypt.

Columella, a Roman of the first century B.C., described a simple method of soil testing. Dampened soil was kneaded in the hand, and if it "sticks to the fingers of the person holding it, in the manner of a pinch, it is fertile."

Other methods of soil testing which were suggested through the ages include the reliance on soil color as an indication of quality—the darker the soil, the better; using taste to determine quality—making a mixture of soil and water and tasting it, after straining, with a sweet-tasting mixture being made of good soil, and sour-tasting mixture of poor soil; and a test which required the gardener dig a hole and then try to refill it with the dirt he removed—if after pressing it with his foot, there was an excess, it was fertile, since poor soil would not fill the hole.

By the end of the middle-ages gardeners were aware of the need for soil quality and that different plants had different soil requirements.

Throughout the history of gardening, men have fought garden pests by various means. Two methods, which were suggested about 1800 years apart from one another, are not recommended.

Columella advised leaving placatory sacrifices for gods to ensure a pest free garden. And in 1742, Peter Kalm wrote of someone who suggested keeping pet sea-gulls "for devouring little beasts injurious to kitchen gardens."

This spring, the Garden presents several programs designed to instruct the individual gardener in the best techniques for his own garden. These programs include both courses and lectures, details of which are printed elsewhere in this *Bulletin*.

There is also a Demonstration Vegetable Garden which will open within the next two months, and planned to show the possible vegetables, common and unusual, which can be cultivated in this area, as well as to demonstrate, by example, efficient methods of the cultivation of these vegetables.

Another source of information for the St. Louis gardener is the library located on the second floor of the John S. Lehmann Building. Members of the Garden are invited and encouraged to use the library, and a special collection of books on horticulture are available for members to borrow on a limited basis.

Finally, the Garden's Answerman Service recommences operation in March. Members with questions or problems pertaining to their lawns, gardens, trees or houseplants may call the Answerman between 9:00 a.m. and 12:00 noon, Monday through Saturday, March through October.

Letter From China

(continued from page 3)

structing experimental plots of plants in beds at varying distances from the different kinds of utilities, then studying their reactions in relation to the kinds of pollutants that are produced by these utilities. They have already identified over 50 kinds of plants, in Nanjing alone, that are highly resistant to pollution, and similar studies are being conducted at botanical institutions throughout China. Their results should be of interest to utilities and industrial plants in the United States. We hope to begin some exchange in personnel in this research area in 1981.

Three scientists from Nanjing will be coming to the United States in 1981. Madam Chin Hui-chen will be studying plant anatomy and systematics at the Garden for about six months, and the others will visit here for shorter periods. In return, Alan Godlewski will visit Nanjing and other botanical gardens in China, for a period of about two months. These long-term visits will be valuable in enhancing cooperative relationships that we have now begun. *— Peter H. Raven*

Photographs by Tamra Engelhorn Raven

Tropical Deforestation

In a recent issue of the journal *Science,* Garden botanist Dr. A. H. Gentry, and his co-author, J. Lopez-Parodi, report that the extensive deforestation of upper parts of the Amazon watershed appears to have resulted in a significant change in the Amazonian water balance. They point out that the height of the annual flood crest at Iquitos, Peru, has increased noticeably in the past decade although there has been no significant change in regional precipitation patterns. This increased flooding indicates that the long-predicted climatic changes for the region may have begun. The possibility that these changes would occur has concerned scientists for some time.

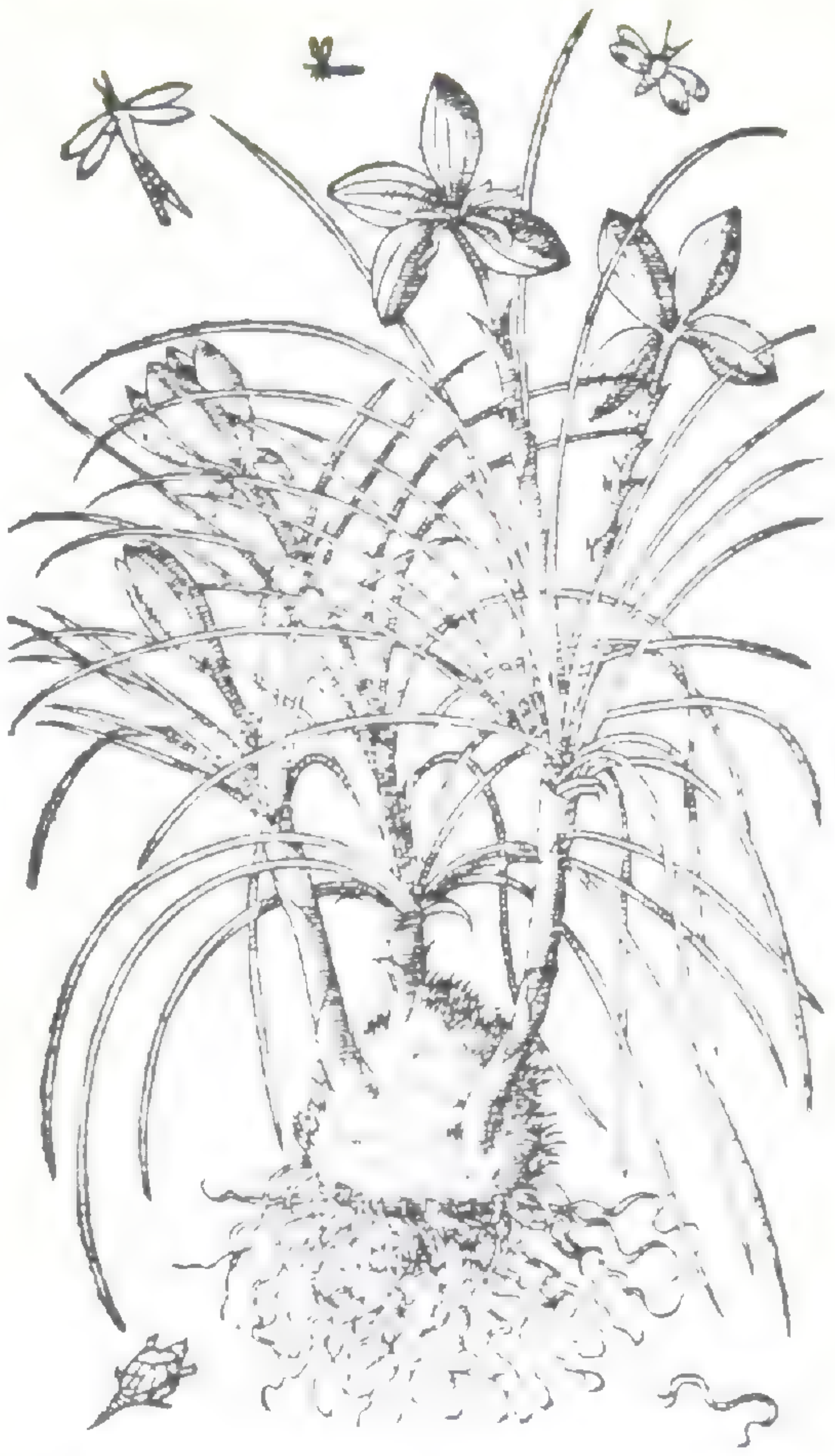
The consequences of the rapid tropical deforestation are manifested in both immediate and gradual ecological changes. The immediate change is the higher annual flood-level which is caused by increasingly rapid run-off of rain water. Because there are fewer trees—Gentry and Lopez-Parodi cite that "one-fifth to one-fourth of the Amazonian forest has already been cut, and the rate of forest destruction is accelerating"—there has been a great loss of water retention capacity. This more rapid run-off also causes greater erosion.

The more gradual change, and one which is more severe, is that the deforestation interrupts the natural process of transpiration—trees soaking up the moisture that falls and recycling it into the air. Scientists have determined that about one-half of the precipitation of the entire Amazonian basin results from this process. The reduction of this process, Gentry and Lopez-Parodi say, could "convert much of.... Amazonia to near desert."

They conclude that this evidence "suggests the need for planned development that takes into account this delicate ecological balance."

Gardening In St. Louis

Getting Ready For Spring



Now is the time to sow annual flower and vegetable seeds to produce transplants for your home garden. There are important rules to insure success:

Obtain fresh seed of good quality. To skimp is false economy. Seed is inexpensive, but the same amount of work is involved raising poor quality seed as good quality, so why waste time and effort to produce poor results with inferior seed. Buy fresh seed which has been packaged for 1981. Date information will be stated on the package. Old seed will not produce inferior plants, but the germination (sprouting) rate will be lower. If you have leftover seeds, it is important they be stored properly.

They should be kept cool and dry. This can be accomplished by putting the opened seed packets in a glass jar and placing a tablespoon or two of a desiccant (a drying agent such as silica gel, a material commonly used in drying flowers) or dried milk in a porous packet or a small bag fashioned from an old nylon stocking. Place jar with seeds and drying agent in refrigerator.

Sow seeds at the proper time. Most annuals and vegetables can be sown indoors six to seven weeks before planting. Cool season plants such as cabbage, lettuce, onions, broccoli, endive, leeks and parsley can be started in mid-March. Warmer crops such as eggplants, tomato, pepper, and cucumber should be sown around mid-April.

Sow the correct amount of seed. Be careful not to sow too many seeds. When seeds are sown thinly, the tiny plants' leaves and roots have more space to spread. If you make the error of sowing too many seeds, thin them out by eliminating the weakest plants and allowing the healthiest to thrive. In general, 66 to 75 percent of seeds you sow will germinate, so it is usually safe to sow twice as many seeds as you will need. Store excess seeds as described earlier.

Use a proper germination medium. Any well-drained potting soil will do if baked for 30-40 minutes at 180 degrees Fahrenheit to kill insects, weed seeds and disease organisms. A good mix consists of one part each of peat-moss, sharp sand, soil and leafmold.

The most trouble-free medium to use is a soilless mix consisting of two parts of spagnum peatmoss, one part perlite and one part vermiculite. To each gallon of this mix add one tablespoon of dolomitic limestone to offset the acidity of the peatmoss. A soilless mix is easy to obtain and mix, and is sterile so it doesn't have to be baked to kill various pests.

Maintain proper moisture, temperature and light. Constant soil moisture and high humidity is necessary for good seed germination. When a seedling begins to germinate, it has few roots and is vulnerable to drying out. Another critical factor is temperature. Almost all seeds germinate best at 70 degrees. Seeds of certain trees, shrubs, and wildflowers require freezing before sowing. Check seed packet for this information. Low temperatures, which cause poor germination, are caused by moisture evaporating from seed flats (this can cool the soil 10 degrees or more), using cold tap water (40-50 degrees), or locating the seed flat next to a cold glass window. There are several ways to assure warm germination temperatures:

- Use a heating cable or propagation mat with a thermostat beneath seed flats.
- Place seed container near a radiator or furnace.
- Put seed flat in closet or on top of flourescent light fixture (the ballast gives off a gentle heat.)

Some seeds sprout better in light; others in darkness. It is recommended you leave the seed container in a bright area, so when seedlings germinate they will grow compactly and not become spindly.

Other Spring Gardening Tips

Don't work the soil too early in the Spring. Make sure it has dried out enough so that when you make a ball of the soil that this ball when dry, crumbles easily. If you work the soil too early, you can destroy its draining capabilities and create large clods of soil which will make working the garden a difficult job for the whole summer.

Prune roses during the first half of April. Be sure to cut out all diseased and dead cane. The entire bush can be cut back to 12-18″.

If you are cramped for space in your garden, try some of the compact varieties of lettuce, bush forms of cucumbers, patio tomatoes, dwarf cabbage, and dwarf eggplants. To conserve space, you might also try growing most of your leaf vegetables and other compact growing vegetables, like beans, in wide rows. When you grow plants in wide rows, you develop a row about 1 foot wide in which the plants which are chosen are interspersed at 6-8″ spacings. You can grow much more lettuce in a small space this way.

Fertilize your lawn with a 10-6-4 fertilizer, or one with a similar ratio, anytime in March of early April. Be sure that part of the nitrogen in the fertilizer is a long-lasting, slow-release type. Follow the directions on the bag for the quantity which should be applied.

Take time out to take a soil sample and send it to your Cooperative Extension Agent. His address is:

St. Louis County Extension Center
701 South Brentwood Blvd.
Clayton, MO 63105

Send $4.50 with the soil sample for complete results. The soil test is the only way you know for sure which fertilizer should be applied to your garden.

—Steven A. Frowine
Chairman, Indoor Horticulture

From the Members' Office

Spring Activities to Focus on St. Louis Lawn and Garden Care

Spring activities at the Garden and at the Shaw Arboretum will focus on lawn and garden care in the St. Louis climate. Members' lectures as well as education programs will focus on topics such as residential landscape design, lawn care, rose culture, and pruning. A demonstration vegetable garden will open in March or April.

Courses offered by the Education Department will be highlighted by a weekend program on edible landscaping, or the "art" of integrating fruit and nut crops into residential and public landscape design. The program will be conducted by Robert Kourik, a staff horticulturist with the Farallones Institute of California.

Other new programs include a six-session course in residential landscape design. Austin P. Tao, ASLA, Tao Design and Associates of St. Louis, will conduct the course. "Interior Plantscaping" will focus on coordinating live plants into home and office spaces. Lisa Cady Leiweke, of St. Louis Plantscape, Inc. will conduct the course.

Programs offered at the Shaw Arboretum will be highlighted by a course on planting residential areas to attract wildlife. Floyd J. Ficker and Charlotte E. Schneider of the Missouri Department of Conservation will conduct the course. Bill Davit, a naturalist on the Arboretum Staff, will conduct a one-day program on organic gardening.

For additional information and to register for the courses, please contact the Education Department at 577-5140. To register for courses at the Shaw Arboretum, call 577-5138.

Spring Lecture Program

Before you begin your garden, join us for "How to Grow" in St. Louis.

Garden Members are invited to attend the 1981 Spring Lecture Series. The Series will focus on "how-to" information designed specifically for the St. Louis area gardener. Learn what grows best in the St. Louis climate, when is the best time to plant, how best to care for your garden and the best way to solve your gardening problems.

The lectures will be held in the Auditorium of the John S. Lehmann Building and will be offered at 10:30 a.m. and 8:00 p.m. on the indicated dates. A question and answer period will follow each presentation.

March 18	**Fruits, Nuts and Berries** Paul Stark, Jr. Vice-President Stark Brothers Nurseries and Orchards Co.
March 25	**Roses** David Vismara Rosarian Missouri Botanical Garden
April 1	**Lawn Care** Rudy Zuroweste Horticulture Specialist University of Missouri Extension
April 8	**Perennials** Alan Godlewski Chairman, Outdoor Horticulture Missouri Botanical Garden
April 15	**Herbs** Holly Shimizu Curator, National Herb Garden National Arboretum
April 22	**Vegetable Gardens** Steven Frowine Chairman, Indoor Horticulture Missouri Botanical Garden

The Annual Spring Flower Show *this year will bring an Ozark woodland to urban St. Louis. The show, which opens March 14 and continues through April 12, will be an informal, progressive exhibit, designed after the fashion of a natural Ozark woodland and will feature spring flowering bulbs, azaleas, annuals and flowering trees and shrubs.*

Littman Scholarship

A scholarship in memory of the late Mr. and Mrs. Ellis C. Littman was established through The Harry Freund Memorial Foundation in December to aid students in botany and horticulture at the Garden. Peter H. Raven, Director of the Garden, said "We are delighted at the fact that it will make it possible for students here to extend their activities and to accomplish more than would otherwise have been possible." Since the initial contribution establishing the Scholarship, several others have been received. The other donors include:

Mary E. Baer
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The Hager Family
Sue and Joe Horan
Mrs. Walter M. Jones
Dorothy and Hubert Moog
St. Louis Herb Society
Ben and Nancy Senturia

Spring in the Garden's Shops

Besides in the Spring Flower Show, the "season of rebirth" also shows itself at the Garden in the Plant Shop and Garden Gate Shop.

During March, the Plant Shop will have *Oxalis tricolor,* a variety of shamrock, available for St. Patrick's Day. In April, the Spring Plant Sale opens with a Members'-only Preview on April 24, from 10:00 a.m. until 6:30 p.m. Garden Members receive a 20% discount on all merchandise. The sale continues on April 25 and 26, when the general public will receive a 10% discount, Member's 20%, on all merchandise. The Shop will feature Geraniums, Impatiens, Petunias, Azaleas, Dogwood, Redbud trees and several herbs. Also, there will be vegetable and flower seeds, clay pots and plant supplies.

Wildflowers are manifested in the Garden Gate Shop in several fashions: on trays, in botanical prints and dried arrangements. There will be vases in which to display your own, fresh, hand-picked wildflowers gathered from your yard or along the roadsides; and, to assist you in identifying the wildflowers you pick or merely see, is Erna Eisendrath's *Missouri Wildflowers of the St. Louis Area.* The shop also has a selection of gardening tools and how-to books to assist you in your own garden.

***Flower Sunday** in 1981 is April 26 at Christ Church Cathedral. It was originally established by Henry Shaw through his will, in which he provided that an annual contribution be made "to the Bishop of the Episcopal Church of this diocese, in consideration that an annual sermon be preached.... on the wisdom and goodness of God as shown in the growth of flowers, fruits..." The Cathedral, at 1210 Locust, will be decorated with several hundred potted flowers, including azaleas, chrysanthemums and geraniums.*

Herb Society Tour

The St. Louis Herb Society is sponsoring a tour of gardens and historic homes in Washington, D.C., and Williamsburg, Virginia, between May 9 and 13, 1981. The trip will include a visit to the United States National Arboretum, the White House, Gunston Hall, Woodlawn Plantation, Stratford Hall, Williamsburg houses and gardens, and several James River plantations. Space is limited. Please call Martha Jones of Sante Travel Agency, 726-3040, for information and reservations. A portion of the trip fee is a tax deductible contribution to the Garden.

Garden Receives Joyce Foundation Grant

In January, the Garden was advised that it was the recipient of a $100,000 Challenge Grant from the Joyce Foundation of Chicago. The Joyce Foundation is a philanthropic organization that makes grants in several fields, primarily to midwestern, non-profit organizations. The Garden had previously received a $5,000 grant from the Joyce Foundation in 1979 to enable Latin American botanists to participate in a symposium on The Flora of Panama.

The Joyce Foundation grant of $100,000 will be divided over 1981-82, and was given to encourage the Garden to seek to increase its basic level of support.

J. Nicholas Goodban of the Joyce Foundation said, "The Joyce Foundation has a strong interest in assisting organizations to increase the breadth and quantity of constituent support. To this end, the first $50,000 of this grant is in the form of a two-part challenge to run during the calendar year of 1981, the comparison period for which is the calendar year of 1980. One-half is to challenge the Garden to obtain at least 1,000 new members making cash subscriptions of twenty-five dollars or more. The other half is to challenge those members who made donations during 1980 to increase their total contributions by at least $50,000."

A Tour of Chinese Gardens

Tamra Engelhorn Raven will present a lecture, "A Tour of Chinese Gardens," on Wednesday, March 11. The lecture will be in the John S. Lehmann Auditorium at 10:30 a.m. and 8:00 p.m.

Earl Shreckengast, New Assistant Director

In early February, Earl Shreckengast joined the Garden staff as Assistant Director for Development, to direct the fund raising and membership programs at the Garden. He was previously Senior Research Analyst at the Governmental Research Institute.

"There are several things I look forward to, immediately," he said. "One is working with the Garden's present members to extend membership throughout the community. The Joyce Foundation's challenge grant provides us with an excellent opportunity in this regard. During 1981, I hope to meet the goal of 1,000 new members and $50,000 in increased giving by members set forth in the conditions of the Foundation's grant.

'The National Endowment for the Arts, through its challenge grant, also presents us with an opportunity to meet our $3 million goal for the Capital Fund. If we meet this goal, it will be possible to complete the Visitor Center as planned.

'Both of these grants present a great opportunity for the Garden to improve its position, both in the community, and as a world-class institution."

December/January New Membership

New Sponsoring Members

Mr. Thomas O. Hall, Jr.
Mr. & Mrs. Bruce G. Roberts
Mr. & Mrs. Joseph E. Westerbeck

New Sustaining Members

Mr. & Mrs. R. E. Bates
Mr. & Mrs. Jimmy A. Corbet
Mr. & Mrs. Edward M. Durham, IV
Mr. & Mrs. James H. Ewold
Mr. & Mrs. E. B. Feutz
Mr. & Mrs. E. R. Grant
Mr. & Mrs. Joseph P. Hopkins
Mr. Harry W. Kroeger
Dr. & Mrs. Maurice J. Lonsway, Jr.
Mr. & Mrs. Andrew S. Love
Dr. & Mrs. W. E. Magee
Mr. & Mrs. Tom E. McCary
Mrs. J. S. McDonnell, III
Mr. & Mrs. Jack W. Minton
Ms. Alice M. O'Dell
Mr. & Mrs. Peter A. Puleo
Mr. Dominic Ribando
Mr. & Mrs. John Ruhoff
Mrs. Howard A. Stamper
Mr. & Mrs. Donald Wildman

New Contributing Members

Mr. Daniel Armbruster
Mr. Donald Bennett
Mr. & Mrs. L. P. Berri
Mrs. Irvin Bettman, Jr.
Mr. & Mrs. Erwin R. Breihan
Mrs. W. F. Campbell
Mr. & Mrs. Morgan B. Carroll
Dr. & Mrs. John Colla
Ms. Katherine Day Denby
Dr. Clara Escuder
Mr. & Mrs. William D. George, Jr.
Mr. & Mrs. W. K. Gilstrap
Mr. & Mrs. Arthur C. Giuliani
Mr. & Mrs. W. Ashley Gray, III
Mr. & Mrs. James H. Harriss
Mr. C. P. Herzog
Mr. & Mrs. William J. Hoeffel
Mr. & Mrs. Jack E. Krueger
Mr. & Mrs. Eugene A. Leonard
Dr. Elizabeth Mann
Mr. & Mrs. Franklin P. Rogers
Mr. & Mrs. Anton Sestric
Ms. Valerie Pantaleoni Terry
Mr. Kevin Twellman
Mr. & Mrs. S. L. Van Petten
Mr. & Mrs. Elmer F. Wander
Mr. & Mrs. W. M. Whitmire
Mr. George Willson III
Mr. & Mrs. John E. Wilsher, Jr.

Board of Trustees Elect New President

C. C. Johnson Spink, Chairman of the Board and Chief Executive Officer of *The Sporting News,* was elected President of the Garden's Board of Trustees on January 21, 1981. He succeeds Tom K. Smith, Jr. who served as president of the Board since January, 1975. Mr. Smith will continue as a trustee. The Board also re-elected William R. Orthwein, Jr., as First Vice-President, Daniel L. Schlafly as Second Vice-President, and Charles R. Orner as Secretary.

Daniel L. Schlafly, Second Vice-President; C. C. Johnson Spink, President; and William R. Orthwein, Jr., First Vice-President

Mr. Spink, a member of the board since 1974, is also a member of the Board of the St. Louis Sports Hall of Fame, the Board of the St. Louis Symphony, and the Trustees Committee of the American Association of Museums. He has been active with *The Sporting News* for over forty years and was the recipient, in 1969, of the Ellis Bruce A. Campbell Memorial Award for Meritorious Service to Sports, and an award from the Advertising Club of Greater St. Louis.

During the six years Tom K. Smith, Jr. was President of the Board, the Garden was in perhaps its most active time since Henry Shaw established it in 1859. The 14-acre Japanese Garden and the English Woodland Garden were opened, and planning was completed and construction begun on the new Visitor Center at the north end of the Garden.

Two Presidents

Since Henry Shaw, there have been fourteen Presidents of the Board of Trustees. All have been deeply concerned for the Garden and its place in the world as a valuable scientific and cultural resource. Like their predecessors, Tom K. Smith, Jr. and C. C. Johnson Spink have vigorously demonstrated their concern through the devotion of their time, energies and unique abilities to Garden leadership.

Tom K. Smith, Jr., the immediate past President, was an officer of the Monsanto Company for almost twenty years, prior to his retirement in the summer of 1979. He joined the Garden's Board in 1963, and was elected its President in January of 1975. During the six years following his election, the Garden was involved primarily in the development and implementation of its Master Plan. As a part of the Plan during those years, the Japanese Garden and English Woodland Garden were opened, and planning was completed and construction begun on the new Visitor Center at the Garden's north end. But, he says, to cite any one of those accomplishments as the single, most important event during that time would be to render an incomplete description of the Garden's progress. According to Mr. Smith, "The Japanese Garden, the English Woodland Garden, the new Center are all but parts of the plan. What is important is the fact that we have created and are carrying out this long-range program aimed at utilizing the significant scientific resources of the Garden. This sets the background to make even greater contributions." The use of these resources should be the primary purpose of the Garden, he feels. "We must make certain that our research is maintained and directed toward areas of lasting importance. We must utilize these past and present technical activities so that our educational programs are more sophisticated and our displays more pertinent to the botanical problems of modern life." Mr. Smith points out that the Garden "is essential in modern life and even more essential to future life." He feels that the new Visitor Center is necessary to the Garden if it will continue to fulfill this role and that it is one of the most important additions to the Garden during its entire history.

C. C. Johnson Spink, newly elected Board President, agrees that the new center will increase the value of the Garden as a resource, and also concurs it is but a part of the important progress the Garden has made during the past decade. Coming into the presidency of the Board, he acknowledges this progress and the work that has occurred before his election. "Through the leadership of Tom Smith and Peter Raven, my job is comparatively easy. All the hard decisions have been made; construction is almost complete."

He sees his task as that of maintaining the growth, of keeping "both functions (scientific and cultural) moving ahead at a pace we can cope with." He stressed the importance of controlled growth, saying he was "concerned over the possibility of over-reaching; of undertaking too many activities." This possibility rises out of the enormous potential the Garden has because of its development over its entire history, and especially during the implementation of the Master Plan.

One of the first projects the Board will undertake, Mr. Spink said, is the formation of a Future Planning Committee to derive a five-year plan which "will establish goals from the Garden's standpoint and from a botanical standpoint." He continued, "We want to make the Garden available to the people of St. Louis and to visitors so that they can enjoy the beauty. We also want to make it a headquarters for scientists. People can be lost in concentration on two levels here. For example, the visitor in the Shapleigh Fountain; and a Swedish scientist in the herbarium and library."

"If you visit the United States and love Gardens," he said, "the one to see is this one, just as if you visited Great Britain, you would see Kew. This is what we've been trying to accomplish for quite some time."

Presidents of the Board of Trustees

Rufus J. Lackland	1889-1909
David F. Kaime	1910
Edwards Whitaker	1910-1926
Edward C. Eliot	1926-1928
George C. Hitchcock	1928-1947
Richard J. Lockwood	1947-1953
John S. Lehmann	1953-1958
Robert Brookings Smith	1958-1962
Henry Hitchcock	1962-1967
Harry E. Wuertenbaecher, Jr.	1967-1970
C. Powell Whitehead	1970-1973
Joseph H. Bascom	1973-1975
Tom K. Smith, Jr.	1975-1981
C. C. Johnson Spink	1981- —

Biblical Plants Exhibit

From the initial mention in Genesis 1:11 of the creation of the earth's vegetation, plants are important parts of the stories and poetic symbolism in both Testaments of the Bible.

The first reference to individual plants in the Bible occurs in Genesis 2:9 "...the tree of life in the center of the garden...and the tree of the knowledge of good and evil." While no other name is given to either tree, no description of the fruits of these trees, one tradition has it that the pomegranate was the fruit of the tree of life. Another tradition names the pomegranate as the fruit of the tree of knowledge of good and evil, although the most common fruit associated with this tree is the apple.

In Genesis 3:7, the first specific plant is named, the fig, "so they (Adam and Eve) sewed fig leaves together..."

The story of the great deluge includes mention of three plants. In Genesis 6:14, Noah is told "Make yourself an ark of gopher wood (cypress)." After the rains had ceased and the water began to recede, Noah sent out a dove to search for dry land. The dove returned with "...in her mouth a freshly plucked olive leaf," a sign that there was land, once more. The third reference to plants in the story of Noah appears in Genesis 9:20-21, in which "He planted a vinyard and he drank of the wine..."

Wine, grapes and grapevines are important symbols in both the Old and New Testaments, with one source listing seventy-eight references to the common grape, *Vitis vinifera,* and three references to *Vitis orientalis,* the wild grape. In the Psalms, the Jewish people were symbolized by "a vine (brought) out of Egypt" (Ps. 80:8) and "a fruitful vine" (Ps. 128:3). Jesus names himself "the true vine," and his apostles branches of the vine in John 15:1,5. In Matthew 26:28, wine becomes a symbol for "the blood of the new covenant," and remains as a symbol today in Christian services.

The infant Moses was saved when his mother put him into "...an ark of bulrushes" (Exodus 2:3) and set among some reeds, where it was found by Pharoah's daughter who adopted Moses. This story is echoed in Isaiah 18:2, where Egypt is said to "send ambassadors by the Nile, in vessels of bulrushes upon the waters."

Other plants mentioned in the Bible include myrrh, which was one of the gifts presented to the infant Jesus by the Magi, (Matthew, 2:11); Galbanum, an ingredient for incense, prescribed by God to Moses, in Exodus 30:34-35; the Date Palm, which was waved by the crowds at Jesus to honor his coming into Jerusalem after raising Lazarus (John 12:12-13); and Henna, which is used metaphorically in the Song of Solomon (1:14).

These plants are among approximately thirty-five which will be featured in a Biblical Plants Exhibit. The Exhibit, in the Mediterranean House, begins March 28 and continues through April 19. There is no admission fee required for the exhibit, above the usual Gate fee. Members, of course, are admitted free.

Prairie Trail

The Arboretum recently established a trail through the experimental prairie tract. This step precedes the development of an interpretive guide for the 1.8-mile trail. The path meanders through the tallgrass to the top of a hill which provides a spectacular vista of the surrounding countryside. The trail enters a grove of trees where a bench provides a resting place, and then it leaves the grove and circles a small pond. The varying moisture levels and drainage conditions provide numerous microenvironments for hundreds of prairie plants. The staff began introducing prairie grasses and flowers to the site in 1980. The site will eventually include a prairie plant demonstration area and interpretive signs. The Missouri Prairie Foundation has provided most of the funds for this project.

N.E.A. Challenge Grant to Assist in Visitor Center Completion

In December, 1980, the National Endowment for the Arts awarded a $350,000 Challenge Grant to the Garden. Announcing the grant, N.E.A. Chairman, Livingston L. Biddle, Jr., said "This $350,000 grant will provide important leverage in the Garden's efforts to launch the second phase of the capital effort to complete the Visitor Center and related support facilities."

The Garden is the first botanical institution to receive a challenge grant from the N.E.A.

Responding to the grant, Garden Director Peter H. Raven said, "We are pleased, indeed, to have received this challenge grant. We are proud that we are the first botanical institution to receive such a grant, and happy because the grant will assist us in the completion of our Visitor Center. Using this grant as a base, we are striving to raise $3 million for the completion of the building."

He expressed the conviction that "this new Center will insure the continuation of the Garden's status as a world-class institution."

Visitor Center Progress

According to McCarthy Brothers, contractor for the new Visitor Center, the Center will be completed by the end of the year, with the formal opening and dedication tentatively scheduled for April, 1982.

Presently contracts exist for the construction of all features of the building except the Floral Display Hall. These features include the 400-seat Shoenberg Auditorium; a 150-capacity Visitor Orientation Theatre, which will feature a six-minute, continuously running, multi-media presentation informing visitors of the Garden exhibits; the educational facilities and offices; the Spink Gallery containing a unique collection of porcelain birds; the plant shop, gift shop and restaurant; and the ticket booth. Access to the Garden grounds will be from the second level of the building.

Exterior features for which construction contracts exist include the Latzer Fountain, to be located in an entrance plaza opposite the Linnean House; and a tram turn-around path which will run past the Climatron and Mediterranean House.

Architect for the project is Hellmuth, Obata and Kassabaum of St. Louis.

The recent N.E.A. Challenge Grant will assist in the completion of the 80,000 square-feet building and its adjacent facilities.

Book Review—"How-To"

While there are many good books that treat the gardener's skills with justice, there is not just one book to do it all. If one book *did* do it all, it wouldn't be any fun, so we have elected to review several.

Gardening for People
(who think they don't know how)
by Douglas Moon
Illustrated by Judy Daniel
John Muir Publications, Sante Fe
(1975)
266 Pages

To begin, a good, **general gardening** reference which I can recommend is *Gardening for People (who think they don't know how)* by Douglas Moon. The book is divided into three sections: The Generalities of Gardening, Landscaping and The Specifics of Gardening.

The generalities section attunes the reader to what might be expected both from the book and from gardening. The landscaping section is a bit brief and very elementary, but has some excellent counsel about planning and integrating lawn and garden areas along with the placement of paths, fences and utility areas. In treating the specifics, the usual topics occur and include lawns, watering and fertilizing, composting, vegetables and herbs and many others. Probably the greatest value of this book is that the author does not try to overwhelm you with his knowledge and leaves you with a great sense of freedom about what kind of gardener you would like to be.

The Seed Starter's Handbook
by Nancy Bubel
Illustrations by Robert Shetterly
Photographs by Mike Bubel
Rodale Press, Emmaus, PA (1978)
363 pages

Many gardening efforts are initially frustrated by an uncertainty of just **how to begin.** Although most gardening references devote sections to beginning procedures, not too many books address the processes of getting started. Nancy Bubel's *The Seed Starters Handbook* does just this. It is, just as she has called it, a handbook, a handy reference. Her methods are sound and workable.

There are five sections. The first one treats in a clear, detailed manner, the mechanics of growing plants from seed. Section Two appropriately deals with the treatment of plants past the seedling stage, preparation and planning of garden beds, and garden pests.

The Third section describes the cultural requirements of nearly 60 vegetables, including herbs and grains. Section Four is very unusual in gardening books. It discusses in some detail the value of saving seeds from one's own plants and instructs the gardener on the mechanics of pollinating and hybridizing his own plants. Section Five is a brief discussion on garden record-keeping, catalogues and seed exchanges.

The Complete Vegetable Gardener's Sourcebook
by Duane Newcomb
Avon (1980)
340 pages

In the past decade, **vegetable gardening** has enjoyed a resurgence of interest which probably surpasses that of the World War II victory gardens. There are numerous excellent books on vegetable gardening, but one that was particularly interesting was *The Complete Vegetable Gardener's Sourcebook* by Duane Newcomb. The outstanding feature of the book is its impressively comprehensive list of vegetable varieties, complete with notes on the average number of days required to bear, the size, shape or color; remarks on performance—and most important!—sources for all the varieties named. The chapters on culture are good. There is even a section on greenhouses, and two sections on the use of hand and power tools. In contrast with the other two books, the information in this book is overwhelming and it is important to remember that it is a resource book.

A Book about Soils for the Home Gardener
by H. Stuart Ortloff and
Henry B. Raymore
William Morrow and Company (1972)
189 pages

A very useful **soils** book is *A Book About Soils for the Home Gardener,* Ortloff and Raymore. One of the problems with books that treat technical subjects for lay people is that the information is either too difficult or so watered down that it says almost nothing. Ortloff and Raymore have struck a good balance between these two extremes and present the facts of soils in a clear, objective and readily understood manner. The book is divided into two sections. The first discusses the nature of soils, describing physical properties, chemical nature, and organic and inorganic fertilizers. The second section treats soil tests and the application of test results, watering and fertilizing, and methods of tilling. *—Kenneth O. Peck*
Manager, Instructional Services

These books are available through the Garden Gate Shop. If they are not in stock, they can be ordered through the Shop.*—Editor*

John Elsley Accepts Position

John Elsley, former Superintendent of the Japanese Garden, accepted the position of Director of Plant Purchasing for the George W. Park Seed Co., of Greenwood, South Carolina, effective February 1, 1981.

Mr. Elsley, who came to the Garden in 1973 as Curator of Hardy Plants, was the designer of the English Woodland Garden. He was a frequent lecturer on the history and design of English and Japanese Gardens, and led several Members' Tours to England, and one to Japan in 1975.

"I've been grateful for the opportunity afforded by the Director," he said. "It's been exciting to have been a small part of the development of the Garden during its most exciting time; in its period of its greatest development during the past seven years."

In his position with Park Seed Co., his role will be to help broaden the spectrum of plants available to the American gardener by the locating of seeds not before commonly offered through catalogues.

Tower Grove House reopens on March 1, 1981, after having been closed during January and February for cleaning and maintenance.

The Garden library recently received Volumes 2 and 3 of the *New York Botanical Garden Illustrated Encyclopedia of Horticulture.* In the November-December, 1980, *Bulletin* Steve Frowine called volume one of the Encyclopedia "a fine comprehensive work which will certainly be recognized as a classic horticultural reference."

Calendar

March

I saw green banks of daffodils,
Slim poplars in the breeze,
Great tan-brown hares in gusty March...—E. W. Tennant

March 1-7
African Violet Society Show; Final Day—March 1
John S. Lehmann Building, 9:00 a.m.-5:00 p.m.

1981 Orchid Show: continues through March 8
Climatron, 10:00 a.m.-4:30 p.m.

March 8-14
Lecture: A Tour of Chinese Gardens: March 11
John S. Lehmann Auditorium, 10:30 a.m. & 8:00 p.m.

Spring Flower Show: Opens on March 14
Tent, Main Gate, 9:00 a.m.-5:00 p.m. (through April 12)

March 15-21
Spring Flower Show continues

Lecture: Fruits, Nuts, Berries: March 18
John S. Lehmann Auditorium, 10:30 a.m. & 8:00 p.m.

March 22-31
Spring Flower Show continues

Lecture: Roses: March 25
John S. Lehmann Auditorium, 10:30 a.m. & 8:00 p.m.

Biblical Plants Exhibit: Opens March 28
Mediterranean House, 9:00 a.m.-4:30 p.m.

April

You know how it is with an April day
When the sun is out and the wind is still...—R. Frost

April 1-4
Spring Flower Show continues

Biblical Plants Exhibit continues

Lecture: Lawn Care: April 1
John S. Lehmann Auditorium, 10:30 a.m. & 8:00 p.m.

Gregg Furber Photography Exhibit opens April 1
John S. Lehmann Lobby (through May 1)

April 5-11
Spring Flower Show continues

Biblical Plants Exhibit continues

Gregg Furber Photography Exhibit continues

Lecture: Perennials: April 8
John S. Lehmann Auditorium, 10:30 a.m. & 8:00 p.m.

April 12-18
Spring Flower Show continues

Biblical Plants Exhibit continues

Gregg Furber Photography Exhibit continues

Rock Garden Exhibit: opens April 12
Outside the Mediterranean House, 9:00 a.m.-5:00 p.m.
(through May 9)

April 19-25
Spring Flower Show: Final Day—April 19

Biblical Plants Exhibit: Final Day—April 19

Gregg Furber Photography Exhibit continues

Rock Garden Exhibit continues

Lecture: Vegetable Gardens: April 22
John S. Lehmann Auditorium, 10:30 a.m. & 8:00 p.m.

Member's Spring Plant Sale Preview: April 24
Plant Shop 10:00 a.m.-6:30 p.m.
(20% discount on all merchandise)

Spring Plant Sale: April 25-26
Plant Shop 9:00 a.m.-5:00 p.m.
(Members 20% off, public 10% off—all merchandise)

Carniverous Plant Display: opens April 25
Climatron patio & Lehmann Building (through May 16)

pril 26-30
Gregg Furber Photography Exhibit continues

Rock Garden Exhibit continues

Flower Sunday: April 26
Christ Church Cathedral, 1210 Locust Street

Member of
The Arts and Education
Fund of Greater St. Louis

TRIBUTES—DECEMBER/JANUARY 1981

In Honor of Mr. Lester P. Ackerman, Jr.'s 60th. Birthday
Mr. & Mrs. Jay V. Zimmerman
In Honor of Mr. & Mrs. Carl L. A. Beckers' 50th. Wedding Anniversary
Margaret and Stanley F. Jackes
Women's Association of the Japan American Society of St. Louis
In Honor of Miss Carol Bitting
Mr. & Mrs. Whitelaw Todd Terry, Jr.
In Honor of Dr. & Mrs. Marvin Cornblath
Dr. & Mrs. Ben H. Senturia
In Honor of Miss Corinne Denning
Mr. & Mrs. Whitelaw Todd Terry, Jr.
In Honor of Mildred Duchon
The George V. Hogan Family
In Honor of the Dr. Joseph C. Edwards Family
The George V. Hogan Family
In Honor of the Elsberry Garden Club
Mrs. Arch (Ruth) Taylor
In Honor of Mr. & Mrs. William Firestone's Wedding Anniversary
Mr. & Mrs. Jerome Michelson
In Honor of Florence Morris Forbes
Jeanne G. Bruns
In Honor of Mrs. Leonard Hornbein's Birthday
Mrs. Jerome E. Cook
Mrs. B. M. Vogel
In Honor of Dr. B. Jasper
The George V. Hogan Family
In Honor of Dr. M. Jasper
The George V. Hogan Family
In Honor of Casey Jones
Nan Thornton Jones
In Honor of Mr. A. B. Kurrus
Mr. Clifford M. Kurrus
In Honor of Mrs. Albert B. Kurrus' 80th. Birthday
Emma May Giger
In Honor of Joseph Laba's Birthday
Mr. & Mrs. Leon Boderheimer
In Honor of Miss Jane Loitman's Birthday
Patricia Smith Hogan
In Honor of Mr. & Mrs. Jose Molina
Mr. & Mrs. Niederlander
In Honor of Mr. & Mrs. Edward Prince
Dr. & Mrs. Ben H. Senturia
In Honor of Michele Rosen's Graduation
Bert and Margie Talcoff
In Honor of Sandy Rosen's Graduation
Bert and Margie Talcoff
In Honor of Mrs. Sidney Rothschild, Jr.'s Birthday
Mr. & Mrs. Louis R. Putzel
In Honor of the Allen Sabol Family
Patricia Smith Hogan
In Honor of Mr. & Mrs. Julian G. and Birdie Samuels' 67th. Wedding Anniversary
Mrs. J. A. Jacobs
Richard S. Samuels
In Honor of Mr. & Mrs. Arthur Scharff
Ann R. Husch
In Honor of Mrs. William Schield
Michael Schield
In Honor of Dr. A. Shah
The George V. Hogan Family
In Honor of Dr. N. Shah
The George V. Hogan Family
In Honor of the Joyce Shelnutt Family
The George V. Hogan Family
In Honor of Mrs. Hazel Smith
Magna Carta Dames of Missouri
In Honor of Samuel Soule
Dr. & Mrs. Franz U. Steinberg
In Honor of Your Special Birthday Mrs. Lloyd Stark
Mrs. William Henry Schield
In Honor of Mr. & Mrs. Howard Swanson
Dr. & Mrs. Ben H. Senturia
In Honor of Beatrice Wolff's 70th. Birthday
Jeanne & Lester Adelson
In Memory of Roland C. Baer
Mr. James M. Canavan
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Mrs. E. R. Hurd, Jr.
Mrs. Priscilla B. McDonnell
Mr. & Mrs. William F. Reck, Jr.
Florence Stern
In Memory of Mr. J. Kennedy Beeson
Mr. & Mrs. John Brodhead, Jr.
In Memory of Mr. Block
From David
In Memory of Mr. Block
The George V. Hogan Family
In Memory of Mrs. Alma C. Blum
Mrs. Edward Boeschenstein
Rose Society of Greater St. Louis
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Helen R. Generelly
In Memory of Mr. George R. Bryant
Whitehall Club, Inc.
In Memory of Ernest Camos
Mrs. George Camos
In Memory of Jacqueline Claeys
Towne South Garden Club #1 Members
In Memory of E. C. Combe
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In Memory of Catherine Conger
Bonnie and Frank Muldey
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Mr. & Mrs. Fred Thies
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In Memory of Mrs. Phil M. Donnelly
Clarence and Drew Benage
In Memory of Bertha Baumann Ecker
Dolores I. Fiege
In Memory of Mrs. Adelaide Eggers
Dr. & Mrs. Armand D. Fries
In Memory of Michael F. Fallert
Mr. & Mrs. Ralph Eck
In Memory of Dale Grant Farmer
Eunice Farmer and Family
In Memory of Father
Mr. Gabriele DeWitt
In Memory of the Father of Mr. David Felix
Sylvia Kalachek
In Memory of Mrs. Barbara Fincke
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In Memory of Brian Frawley
Patricia Smith Hogan

In Memory of Grant Gibson
Patricia Smith Hogan

In Memory of Lenora Wildred Gunn
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In Memory of W. Alfred Hayes
Sue and Kip Rapp

In Memory of George C. Hetlage
Mr. & Mrs. George C. Jensen

In Memory of Mrs. Penny Holmes
Mr. & Mrs. George Watson Skinner

In Memory of Sidney Holtzman
Mrs. Gloria Hogbin

In Memory of Oscar Kahan
Albert and Phyllis Fitzgerald

In Memory of Mrs. Clara Wirth's Mother, Mrs. Kirks
Mrs. J. Jacobs

In Memory of John Kloepper
Sue Straub

In Memory of Mr. Elmer J. Kulla
Mr. & Mrs. William L. Redmond

In Memory of Mr. Milton S. Landau
Mr. & Mrs. Edwin Waldemer

In Memory of Mr. George Lane
Mrs. William Carson
Mary E. Clymonts
Rose T. Engel
Mrs. Wilbur B. Jones
Martin M. Kerwin
Lane Machinery Co.
Mrs. Willis E. McClain

In Memory of Raymond E. Lange
Mrs. Raymond Lange

In Memory of Mrs. Dorothy Laswell
Mr. & Mrs. Walter Hosea

In Memory of Joseph Leah, Jr.
Mr. & Mrs. J. Hardin Smith

In Memory of Roslyn and Ellis C. Littmann
Mary E. Baer
Jerome M. Barker
Mr. & Mrs. Joel E. Cater
Mrs. Morris Glik
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Persons interested in contributing to the Tribute Fund may contact the Development Office, 577-5120.

During early-1981, the Linnean House was restored to its circa 1900 appearance. The ridgecrest, at apex behind worker, was part of the restoration.

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A Regard For History: Restoring the Linnean House

Walking through the Linnean House with Gerhardt Kramer, we begin to understand what he meant when he said, "Buildings have a story to tell." He points to things we had probably looked at before, but with our untrained eyes, never really seen nor understood the significance of: a slight, diagonal paint line on the inside wall near the roof; a section of bricks in the east wall which does not match, in color, those around it; a small, rectangular relief on a door frame. These are the elements from which the building's story is structured. The paint line indicates to Gerhardt Kramer that there was originally a lower ceiling in the House. The off-colored bricks tell him there was once a window that extended to within a few inches of the ground where now the window stops several feet short of it. The small area of relief shows that there was a hinge there, once, and that the door originally opened into the House instead of out of it, as it now does.

Kramer, of Kramer & Harms, Architects, was commissioned in 1977 to restore the Linnean House, the oldest operating greenhouse west of the Mississippi River, located at the north end of Missouri Botanical Garden. The Linnean House is one of four historical buildings in the Garden built by its founder, Henry Shaw, a nineteenth-century Englishman who came to St. Louis as a merchant in 1819. He retired at the age of forty, in 1840, and opened his Garden twenty years later. In the early 1880's he built three greenhouses, the Linnean House and two others which still stand in Tower Grove Park and are used there as garages. Because he could see the Linnean House from his home, Shaw made it the most ornate of the three.

Between 1882, when the Linnean House was opened, and 1977, when restoration was begun, the structure of the greenhouse was changed several times. Working from old photographs, written records from the Garden's archives, and "The stories the building, itself, tells," Kramer produced a history of those changes.

Shaw built the Linnean House as an orangery, which is a place to store, during the winter, potted plants which cannot survive freezing temperatures. Early in the twentieth century, the building was converted to a greenhouse and some modifications were necessary. The most radical of these was in changing the roof from two-thirds slate and one-third glass to all glass in order to admit the light necessary to grow plants there throughout the year.

Also about this time—1918—four windows on the northern elevation were filled in with concrete; the coverings on the end wall parapets were changed from copper to terra cotta; and

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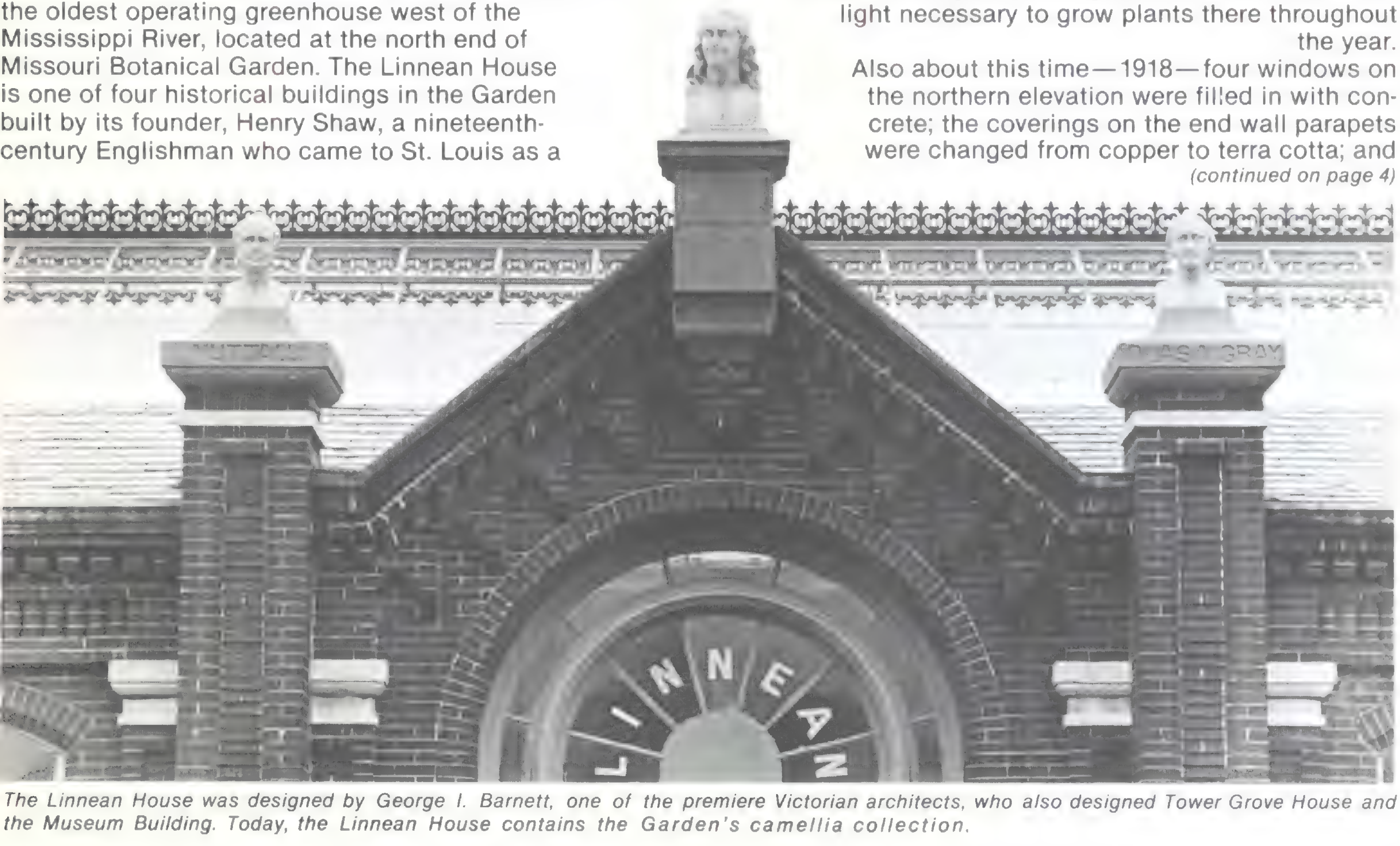

The Linnean House was designed by George I. Barnett, one of the premiere Victorian architects, who also designed Tower Grove House and the Museum Building. Today, the Linnean House contains the Garden's camellia collection.

Comment

Peter H. Raven

Pioneer Hi-Bred International, Inc. of Des Moines, Iowa, recently established the William L. Brown Fellowship at Missouri Botanical Garden. This postdoctoral fellowship commemorates the retirement of William L. Brown as Chairman and Chief Executive at Pioneer Hi-Bred, and will be used to assist the Garden in its work of cataloging, understanding, and preserving plant genetic diversity. Pioneer Hi-Bred International is one of the largest seed companies in the world and is a leader in the genetic supply industry that develops, produces, and markets improved seed stocks used in agriculture.

The Fellowship was announed at a retirement dinner for Dr. Brown, which I attended, that was held in Des Moines on January 26. Dr. Brown received his Ph.D. in genetics from Washington University in 1941, working with Dr. Edgar Anderson of the staff of the Garden and the Henry Shaw School of Botany at Washington University. He has made substantial personal contributions to the understanding of plant genetics and to the progress of Pioneer Hi-Bred International in this area and was recently elected a member of the U.S. National Academy of Sciences in recognition of his important scientific work and his role in the field.

Connections between Missouri Botanical Garden and Pioneer Hi-Bred International are even more extensive than would be suggested by Dr. Brown's background. Dr. Donald N. Duvick, Director of the Plant Breeding Division of Pioneer Hi-Bred International is also a student of Edgar Anderson and a graduate of Washington University. The first president of the company was Fred W. Lehmann, Jr. who was president from 1933 to 1954 and then Chairman of the Board of

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Letter From Peru

Dr. Croat collecting in Peru

I am now almost midway through a trip of 3 months duration in South America. My specialty, and the emphasis of the collecting trip, is the aroid (jack-in-the-pulpit) family (Araceae). This family seems to have its richest diversity in the mountain valleys between Costa Rica and Peru with perhaps the greatest concentration of species in Columbia and Ecuador. The family consists largely of epiphytes—"air plants"—and thus thrives in wet forests, especially cloud forests, where the plants, which must derive all of their moisture from runoff from the trees, manage to survive best. Because the plants have evolved to endure periods of drought, it is possible to ship live specimins to St. Louis for cultivation at Missouri Botanical Garden.

I collect the plants from trees and remove all the leaves and most of the roots from the stem. Then I scrub them with a brush in water to remove all dirt and debris from the stems, wrap them in aluminum foil to prevent excessive dehydration, and package and ship them by air freight to St. Louis, where they are buried in beds of moist sphagnum moss for several months until they develop new roots and begin to leaf out. On this trip I have shipped back more than a thousand cuttings, representing collections from all over Ecuador and Peru.

Currently I am working with a National Science Foundation grant that provides funds to do a revision of the birdsnest *Anthuriums,* so named because the leaves form a nestlike basket which collects debris and moisture. The densely rooted stems are usually short and some of the roots grow up into the debris to obtain nutrients. This special adaptation allows these plants to grow in relatively dry areas. In fact, one area along the Pacific coast was so dry I was very dubious of finding any aroids. I was drawn there, however, by a collection made recently in the area by another botanist. Sure enough, the species was there in abundance, but no other aroids were found.

This trip began in Ecuador where I rented a car and covered nearly all of the tropical areas where aroids occur. After a month there, I came to Peru. Here I made use of a special fare which allows a tourist to fly anywhere in Peru in a 15-day period for $120. This permitted me to cover many parts of Peru quickly and obtain most of the species I wanted.

Next I will fly to Bolivia for two weeks of collecting. There are fewer species in Bolivia since it is so far south that it is somewhat out of the range of the family. I will return to Quito to pick up equipment stored there and then begin a trip overland into Columbia. I will fly back to the states from Medellin after a trip into the Department of Choco, which is a rich area adjacent to the Darien jungles of Panama, in which few collections have been made. The area (or parts of it) is reputed to have the world's highest average annual rainfall.

By the time I return to St. Louis I expect to have made almost 2000 aroid collections. These will be added to the approximately 2500 plants already growing at the Garden, making this collection the largest of living Araceae in the world. —*Tom Croat, Paul A. Schulze Curator of Botany*

State Senate Passes Tax District Bill

In March, the Missouri State Senate passed a bill calling for the establishment of the botanical garden sub-district of the Zoo-Museum Tax District. The bill is now being considered by the State House of Representatives.

The voters of St. Louis and St. Louis County must approve the measure before the Garden will receive funds through the Tax District.

Prairie Day

Missouri Department of Conservation will hold a Prairie Day on Saturday, May 16, at Paint Brush Prairie. Beginning at 8 a.m., the day will include informal lectures, guided walks, historical exhibits and storytelling for children. For more information, contact Gordon Maupin at Dept. of Conservation; P. O. Box 180; Jefferson City, MO 65102. Phone, 1-751-4115.

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Comment

(continued from page 2)

Directors of the company from 1954 until his death in 1961. Mr. Lehmann originally founded the company with Henry Wallace who soon left to become U.S. Secretary of Agriculture. He maintained his law practice in St. Louis while serving as President and was the brother of John S. Lehmann, who was an important benefactor of Missouri Botanical Garden and served as President of its Board of Trustees from 1953 to 1957.

At a time when plant genetic diversity, especially in the tropics, is being drastically reduced with every passing year, this new fellowship will make possible a significant increase in the Garden's ability to perform studies of plants throughout the world. The first recipient of the fellowship will be Dr. James C. Solomon, a recent graduate of Washington University, who will shortly leave for Bolivia with his wife, Andrea, to take up residence there and contribute to our appreciation of the little-known plants of that large South American country. We are most appreciative to Pioneer Hi-Bred International for recognizing the importance of our work in commemorating, in such a significant way, the services of one of our graduates.

A Regard For History

(continued from page 1)

wooden trellises were attached to the brick on the south elevation. In 1927, the glass roof was severely damaged by a hail storm and the roof was changed again, this time to one-third asphalt tile and two-thirds glass.

The building has also been affected by almost a century of wind, heat, cold and precipitation.

After writing the history, Kramer, with the Garden staff, considered how to approach the restoration. It was not a simple matter of returning the edifice to its 1882 appearance. "Most restoration is a compromise between the practical and the original, but generally highly impractical condition," Kramer said. "For example, it would be impractical to restore the roof to its original state, in which only one-third of it was glass, because the building's purpose has changed since then. It would also be impractical to return to the all-glass roof of 1918, because of the experience of the 1927 hailstorm." The compromise which Kramer and the Garden staff reached was to retain the practical, two-thirds glass roof, and replace the asphalt roofing tile with slate tile similar to that used in the construction of the building.

Sometimes, it is necessary to take some license in restoration, and the architect must select materials that were not used in the original construction or even throughout the history of a building. Again, any license taken rises out of practical considerations. With the Linnean House, Kramer decided that limestone window sills were more practical than the wooden sills installed on the interior a century ago. He says, "Since most of the original wood sills had rotted out because of the moisture content of the building, we decided it would not make any sense to replace them with new wooden sills, because they would rot out too, and have to be replaced later. That is impractical. They made a mistake in the original construction; there is no sense in repeating it, so we substituted limestone. There is a precedent for using that. It's consistant with construction of the era."

Looking at an eighty-year-old photograph, Gerhart Kramer demonstrates how a historical architect is sometimes a detective. "When this ironwork was removed is a mystery," he says, pointing with a pencil to the ornamental ridgecresting at the apex of the building. "We think the crest was taken off in about 1918, but can't know for sure. There are no records," he says. "To duplicate it, we determined the width of each unit of the crest by dividing the actual number of units shown in the photograph between a measured horizontal distance below. When the width was determined, the height and details were easily determined by proportion from an enlarged photograph." Magnifying the photograph and producing a close detail of the crest, Kramer was able to draw a pencil sketch of the ironwork. Then a wood model was made, and from that, a casting.

In the same photograph, Kramer indicates the upper, semi-circular portions of three windows in the east wall which are darker than the lower sections of the same windows. We think it is a shadow, perhaps a trick of lighting, but he tells us they were sections of colored glass. Taking us to Tower Grove Park to one of the other two greenhouses that Shaw built he shows us the colored glass that remains in the east and west walls of that house. "We used the windows here to determine the color of glass to install in the Linnean House."

In that house in Tower Grove Park, among parked trucks and machinery, we can see something of how the Linnean House appeared a century ago, with the lower ceiling and the roof that is only one-third glass. "We used this building as a model for our restoration," Kramer says.

At the Linnean House, he tells us that the paint on the trim and doors matches the original color. The method through which he determined the original color sounds like more detective work. He says, "We used a solution of three parts alcohol and six parts ammonia. This dissolves the paint layers slowly and is not as hard on the wood as commercial solutions. As the solution softened the paint, we scraped away one layer at a time. It took about two or three hours of work to find the original color."

He shows us the other changes that are part of the restoration. The terra cotta covering on the end wall parapets have been replaced by copper with a rolled seam. The word "Linnean" has been repainted on the fanlight transom over the door, and the front doors have been changed to resemble the original. The building has been cleaned and tuckpointed, and the steps at the east and west doors have been repaired.

Talking with Kramer a few days later, he tells us, "Restoring this building is important for several reasons. One, because of its importance in the new plan of the Garden — it will be the first building people will see when they come out of the new Center. Also, because in restoration, you are able to conserve natural materials. But, most importantly, I think it gives us and future generations the chance to see how the people of the past performed. It presents a true story with no distortion or inaccuracy."

The restoration of the Linnean House was made possible by funds from Missouri Pacific Railroad Company, the Heritage Conservation Recreation Service through the Missouri Department of Natural Resources, The Swedish Council of St. Louis, St. Louis Community Development Agency, and the Garden Club of St. Louis.

Gardening In St. Louis

Summer Gardening

Time to water. Hot, dry weather brings to the gardener the constant and important job of watering plants. Rose bushes require about 5 gallons of water per bush per week to be most productive. Vegetable gardens require about 1″ of water per week. Annuals and perennials have about the same requirements. Plants which do not receive adequate water can suffer permanent tissue damage and will never recover.

Temperatures also have critical effects on plants. If the evening temperatures drop to 59°F or below, the flowers will drop from tomato plants and no fruit will form. Also high temperatures, especially when accompanied by wind, will dehydrate plants quickly and make more frequent watering necessary. On hot, dry, windy, summer days you will notice that some plants will wilt even when the ground is moist. This happens when water is evaporating from the small holes in plant leaves (called stomates) quicker than it can be replenished from the roots. This will not usually lead to permanent damage and the leaves will regain their stiffness during the evening. You can help the plants during these hot, dry periods by thoroughly watering them. Water applied in the noonday sun to plant foliage will cause no harmful spotting of leaves (an old-wives'-tale), but will greatly benefit the plant by lowering the temperature of the leaf surface and by quickly restoring water to the leaf tissue.

Fungus among us. Insects and diseases are multiplying rapidly at this time of the year. To give you some idea of how fast insects reproduce, an entomologist named Dr. Hodge computed that if a pair of flies started reproducing in April, by August they would be the progenitors, if all offspring were to live, of 191 quintillion individuals. Allowing ⅛ cubic inch per fly, there would be enough flies produced to cover the earth 47 feet deep!

The most intelligent approach to controlling garden pests is to try integrated control. This involves employing biological, cultural and chemical controls concurrently.

When biological control is used by trained entomologists for specific pests it can be very effective. For the home gardener to purchase quart containers of lady beetles to kill aphids or scales or to buy praying mantis egg cases is essentially a waste of time and money. The purchased lady beetles usually either migrate soon after they are released or starve to death from lack of food. Praying mantises are effective in killing large insects, but unfortunately most destructive insects are small, such as aphids, white flies or spider mites. Mantises are also indiscriminate killers; they eat beneficial insects as well as each other. A good gardener should encourage the establishment of beneficial insects by judicious spraying. To protect pollinating insects, especially honeybees, spray in the early evening after the bees have returned to their hive.

There are many tangible ways that a gardener can control insects and diseases by cultural methods. Only use seeds, bulbs and cuttings from healthy plants; disinfect seeds and bulbs before you plant them with a fungacide such as captan or benomyl; and pasteurize all soil used for sprouting seeds or rooting cuttings by baking the soil at 180°F for 30 minutes or by drenching the soil with a 1:9 solution of cholorine bleach and water. Let the drenched soil sit overnight before using it for rooting cuttings or transplanting. Take precautions against transfer of disease by using clean garden tools. Whenever you spot suspicious growth or damage on your plants, remove the limb or dispose of the entire plant. Weeds should also be controlled. They serve as hiding places for insects and carriers of various diseases.

One of the best cultural controls is to grow disease-resistant varieties of plants. Hybridizers have made great strides in producing more vigorous plants which resist insect and disease attacks. Also, be sure you provide the right growing conditions for your plants. If they are being improperly watered or fertilized, the plants will be more susceptible to disease and insect infestations.

Chemical control of insect pests has come under attack as being very hazardous to people and the environment. It can be, but it does not have to be. If chemicals are carefully chosen and used at the correct dilutions, they are a safe and effective control for insects and diseases. Chemicals should not be used exclusively, but should be combined with biological and cultural controls. Use chemicals which are not residual and which have a low animal toxicity. Insecticides in this category include malathion, diazinon, rotemone and sevin. Some low-toxicity fungicides are phaltan, captan or benomyl. *Before using any chemical material always read the label!*

Summer Gardening Checklist

- Lawn mowers should be set to cut 2-2½″ for a bluegrass lawn and ¾″-1″ for a Zoysia or Bermuda lawn.
- Pinch all annual flowering plants to make them bushy.
- Mulch your tomatoes 3-5″ with any organic material like straw or bark. Do not let the soil around them get too dry or the fruits will develop blossom end rot (a black spot in the center of the fruit).
- If you have had your vegetables and flowers in for 4-6 weeks, side dress them with about 1-2 lbs. of 5-10-5 fertilizer per 100 sq. feet.
- If the weather is hot, be on the lookout for spider mites on junipers and other plants. For minor infestations, hose the plants off with a strong jet of water. If you have a bad infestation, apply Kelthane.

— Steven A. Frowine
Chairman, Indoor Horticulture

From the Members Office

Henry Shaw Fund Success

Harry Wuertenbaecher, Jr., Chairman of the 1980 Henry Shaw Fund, announced that the Fund surpassed its goal of $325,000. He made the announcement at the February meeting of the Garden's Board of Trustees and at the same time acknowledged the effort of those who participated in the Fund. Addressing the Fund Committee members, he said "This was a difficult task and was accomplished only because of the work that you and others like you contributed to this endeavor. The work you have started, and I hope will continue, will certainly help us in the years to come."

Committee members included Carl Beckers, Jules D. Campbell, Gary Close, Alan E. Doede, Charles G. Houghton III, W. Boardman Jones, Robert Kresko, Hugh Lewis, H. Dean Mann, William R. Orthwein, Jr. Lucianna Gladney Ross and Warren M. Shapleigh.

The Henry Shaw Fund assists in the support of the education programs and provides that the Garden and its facilities are available to the greatest number of people.

Members of the 1980 Henry Shaw Fund Committee were honored for their successful efforts at the February Trustees meeting. Shown are (l. to r.) Carl Beckers, Gary Close, Alan Doede, H. Dean Mann, Harry Wuertenbaecher, Jr., (Chairman), and Hugh Lewis.

Matching Gifts

Many Garden Members increase the value of their contributions to the Garden through corporate matching gift programs. In 1980, employees of several companies, including Monsanto, Granite City Steel, Brunswick, Lever Brothers, Times-Mirror, Citibank and Phillip Morris, doubled their contributions through their employers' programs. Over fifty St. Louis area companies have such programs. Members can determine if their companies provide matching gifts by inquiring with their personnel departments. For further information or assistance, they may contact the Garden's Development Office, 577-5120.

Tamra Raven To Lead Chinese Garden Tour

Tamra Engelhorn Raven will lead a tour of Garden Members to China in Spring, 1982. The tour, scheduled for April 24 through May 13, 1982, will include visits to Chinese gardens, museums, temples and palaces in Beijing (Peking), Nanjing, Wusi, Suzhou, Shanghai and Hangzhou. After leaving China, Members will visit Kyoto, the garden city of Japan, for three days.

"We will view the gardens, tombs and palaces as indexes to the ways the Chinese have looked at their natural environment," Mrs. Raven said. "This is an exciting opportunity for Members to learn something about a culture that has, until recently, been inaccessible to us.'"

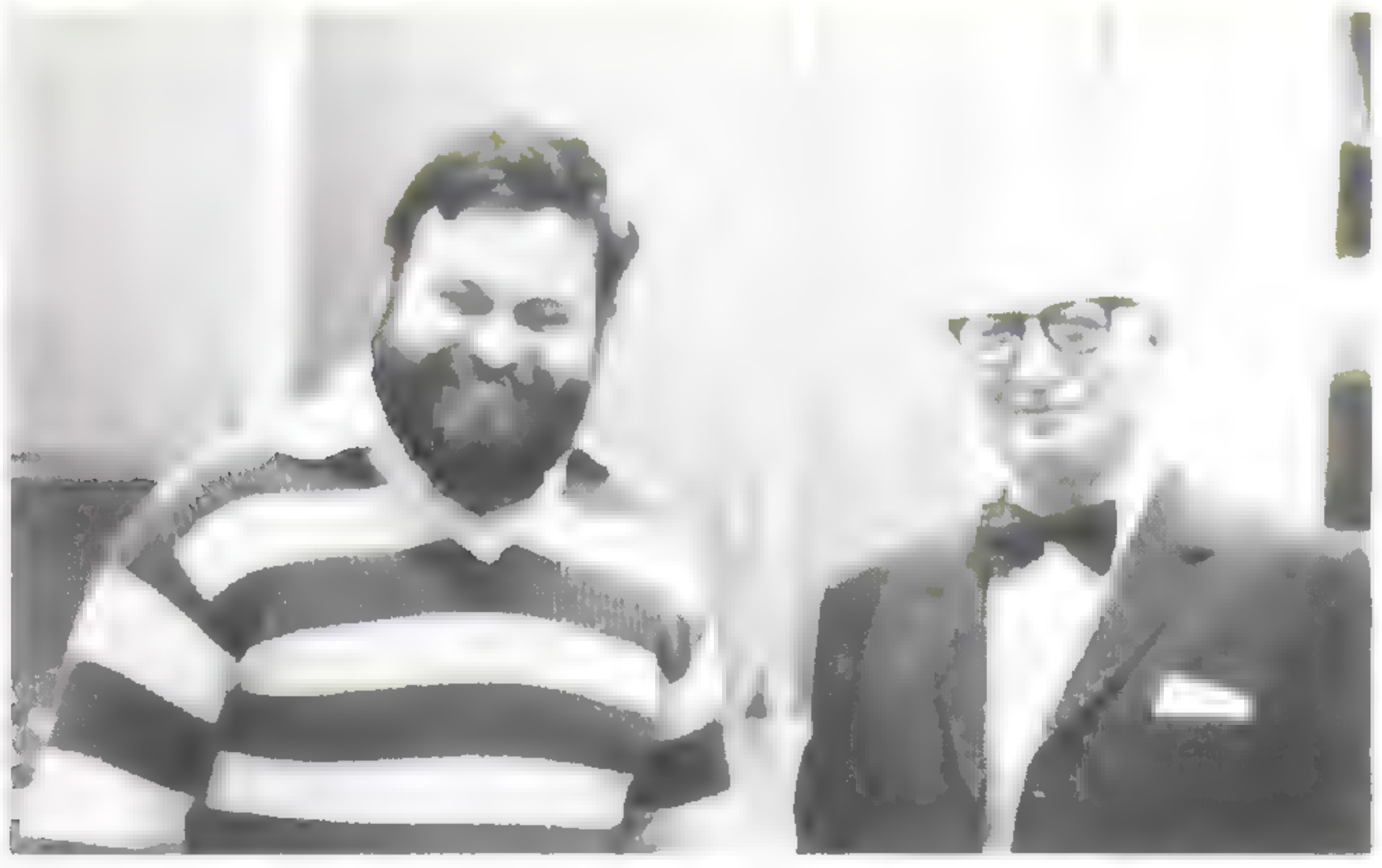
Members interested in further details about the trip or in joining the tour may call the Members Office, 577-5120.

A portion of the tour fee is a tax-deductible contribution to the Garden.

The annual meeting of the **Missouri Prairie Foundation** will be held Saturday, May 2, in the John S. Lehmann Building, from 9 a.m. until 12 noon. Members of the Garden are invited to attend.

Rose Evening

Members of the Garden are invited to attend Rose Evening on Friday, June 5, 6-8 pm, in the two rose gardens. There will be music and refreshments. Members will receive further details in the mail.



Dr. Bassett Maguire *(right) visited the Garden recently in connection with his special interest in the Guyana highlands of South America. Dr. Maguire, Senior Scientist and Director Emeritus of Botany and Research at the New York Botanical Garden, spoke with Dr. Gerritt Davidse (left) of the botany staff here. Dr. Davidse is in charge of the Garden's research in Venezuela, where the Guyana highlands are located.*

Anthropologist Visits Garden

Anthropologist Brent Berlin, of the faculty of University of California-Berkeley, visited the Garden in March. He has been working, for almost a decade, with the botany department in his research in folk systems of plant classification in cultures of Mexico and Central America. Collecting plants identified by folk names, he sends them to the herbarium here for identification by our staff members. He has found remarkable similarities between the folk classifications and those developed by European and other scientists over the past several hundred years, arriving at the theory that folk taxonomies function in the same manner as the western ones, both systems being confined by the same biological realities.

"This exchange demonstrates the tremendous value of cooperation between the sciences," said Dr. Marshall Crosby, the Garden's Director of Research. "Both the fields of anthropology and botany benefit from our work with Dr. Berlin. Our collection of plant specimins is increased in size and importance by those he sends us and he is able to continue his work of studying folk taxonomies because of our identifications.

Oceans, Deserts and Whales

Call it a whale in a dry ocean, the jojoba (pronounced ho-HO-ba). Actually a shrub native to the Sonoran Desert of southwestern United States and northern Mexico, the jojoba yields a dark brown fruit, slightly larger than a peanut, which produces a yellowish, odorless, liquid wax. The wax, known as "jojoba oil," has some amazing properties which have stirred the interest of investors, scientists, farmers and environmentalists. The last are interested because jojoba oil is a "virtual duplicate" of sperm whale oil, that assessment coming from a report of the National Academy of Sciences in a 1975 study. The sperm whale had become an endangered species because of the tremendous industrial demand for its oil; approximately 20,000 of the mammals were being killed each year. Environmentalists hope that domestic cultivation of the jojoba will decrease the demand for sperm whale oil.

A list of the uses of jojoba oil filled two pages in the NAS study, and included: lubricant of high-speed machinery; additive to other lubricants; transformer oil; ingredient in hair oil, shampoo, soap, face creams and sunscreens; stabilizer of penicillin products; cooking oil; furniture, automobile, and floor wax.

The Indians of the region have long used jojoba oil as grease and as medicine, but it was not until the mid-1970's that the commercial potential of the oil was recognized. Its similarity to sperm whale oil is only one of the reasons for its attractiveness to investors and growers—*Wall Street Digest* named it as the third best investment of the eighties, after real estate and rare coins. Reading the available literature on jojoba is like reading a litany of praise: drought resistant; apparently disease and pest resistant; grows in soils of marginal fertility; requires little water—in Israel, where the plant was introduced in the 1960's, jojoba is irrigated with salt water; low labor-intensive crop. One investor claims that within ten years jojoba crops will return 200% profit annually, calling it "the silver of the 1990's."

However, sifting through the praise, it becomes apparent that there are some difficulties extant in large-scale, commercial jojoba cultivation. Ralph Boyd, whose company, American Jojoba Industries, Inc., is planting 6000 acres of the crop in Arizona and California, warned, "There's no such thing as a safe agricultural investment. It isn't as easy as throwing a couple of seeds on the counter and becoming a millionaire."

In order for the jojoba to become commercially viable, it needs to be domesticated. The yield from wild shrubs is not large enough to ensure the supply of oil that industry needs if it is going to use jojoba in place of the sperm whale. Domestication is not a quick and simple process and, for now, according to the *Wall Street Journal,* "Cultivated plants are too new to add substantially to production."

Also, as is the case in all monocropping, there is the danger that disease or pests could swiftly obliterate an entire crop. Genetic variety needs to be introduced into the jojoba so tht there would be enough resistant individuals to maintain the existence of the species if disease should occur.

There is also the problem of sex, since jojoba is a dioecious plant (male and female flowers occur on separate plants). Because the commercial value of the plant is in its fruit, it is the female plant in which growers are interested. The male is useless, commercially, except to provide pollin for the female plant in which growers are interested. Further, there is no practical way to determine the sex of an individual plant until it bears flowers, which occurs in the second or third year. A grower pays for many seedlings that he cannot use.

Despite the potential drawbacks, which are not insurmountable, and inspired by the possibility of great profits, investors are placing more and more of their financial resources into the crop. During 1981, somewhere around 200 tons of jojoba oil will be produced, which is about 52,000 gallons. By the end of the current decade, production is expected to reach approximately 127,000 tons.

In conjunction with the Mammillaria Exhibit in the Desert House, May 2-24, the Garden will display a collection of several jojoba shrubs along with samples of jojoba products, beans, oil and interpretive text. The display of jojoba is part of the Garden's continuing effort to inform and instruct its Members and the community in general about the importance of plant life to humanity.

Herbarium Curator Appointed

Nancy R. Morin has been appointed Administrative Curator of the Herbarium in the Department of Botany. She received her Ph.D. in 1980 from the University of California at Berkeley and has just completed a postdoctoral fellowship at the Botany Department, Smithsonian Institution. Dr. Morin will supervise the curatorial staff of the herbarium. The herbarium contains approximately 3-million individual plant specimens, and employs a support staff of twenty persons to mount newly-acquired plants, ship and receive loan and exchange specimens, type labels, and file and retrieve plants from the compactor storage units in which they are permanently stored.

In addition to her supervisory responsibilities, Dr. Morin will edit the Garden's quarterly scientific publication, *Annals of the Missouri Botanical Garden,* and continue her research in the bluebell family, Campanulaceae.

Nancy R. Morin

Climatron Anniversary Celebration

In February, the Garden celebrated the twentieth anniversary of the opening of the Climatron. Cited by the American Institute of Architects in 1976 as one of the outstanding architectural achievements in American history, the tropical greenhouse was designed by Murphy & Mackey, Architects. Joseph Murphy of that firm was one of the principal speakers at the ceremony which opened the celebration. Other speakers were Eugene Mackey III, son of the principal architect of the Climatron; Wayne C. Kennedy, Director of St. Louis County Parks; William R. Orthwein, Jr. First Vice-President of the Garden's Board of Trustees; and Garden Director, Peter H. Raven.

Joseph Murphy addresses celebration audience.

Supporting Members attended a special preview of Climatron celebration.

In his comments, Dr. Raven expressed gratitude to Dr. Frits Went and Robert Brookings Smith, respectively the Garden Director and Board President at the time of the Climatron construction.

Dr. Raven said, "The Climatron is unequalled in its ability to display tropical plants in a naturalistic setting. We take this very seriously because it is very important for the public to have at least one image of what the tropics look like if they are to understand the importance of this vast resource.

"So, we celebrate the twentieth anniversary of this building for those who had the vision and for those who designed and built it, but most of all for you, the public, who have enjoyed it, learned from it, and supported it."

Robert Brookings Smith Elected Honorary Trustee

At its January meeting, the Board of Trustees elected Robert Brookings Smith as an Honorary Trustee in gratitude for his service to the Garden. Mr. Smith was President of the Board from 1958 until 1962, and under his leadership the Garden realized several significant achievements, most notably the construction and opening of the Climatron.

Also during his presidency, the Garden celebrated the centennial year of its opening, the first Rose Test Garden for the All America Rose Society was established and the rehabilitation and renovation of Tower Grove House was completed. Attendance increased from 240,000 in 1958 to over 400,000 by 1961.

Japanese Festival: June 13-21

The sixth annual Japanese Festival, nine days of exhibition, demonstration and performance, and one of the cultural highlights of a St. Louis summer, opens on June 13. The festival will include traditional, Japanese music and dance, food, costumes, and martial arts. There will be demonstrations of Japanese cooking, bonsai, ikebana and oregami, as well as lectures, films and travelogues on Japan.

The popular Taiko Drummers from San Francisco will return to the Festival for the fourth consecutive year.

A special children's day is scheduled for Saturday, June 20. The Festival continues through Sunday, the 21st.

Through the generosity of the Japan America Society, one round-trip airfare to Japan, via Japan Air Lines will be awarded as an attendance prize. The flight will depart from St. Louis on October 10, 1981, and return October 24. (Dates subject to change).

During the Festival, on weekends the admission charge will be increased for non-Members and Members will be charged a nominal fee. Further details will be announced later.

Israeli Festival

An Israeli Festival, sponsored by the Jewish National Fund, will be held at the Garden on Sunday, May 24 from 11:00 a.m. until 4:00 p.m. The Festival, a celebration of culture and tradition, will include music, dance, food, drink, art, crafts, childrens' activities and a photography exhibit chronicling the work of the Jewish National Fund in Israel. The JNF, founded in 1901, is Israel's Land Development Authority, administering, developing and holding in trust 92% of Israel's public land for the Jewish people.

Summer Youth Programs

This summer, the Garden offers several exciting educational programs for students 7 to 16 years old.

The Pitzman Nature Program, begun twenty-four years ago, provides courses in solar energy, microscopes and desert ecology in one-day investigative workshops, and experience in cooperating with the natural world in three several-day-long programs at the Shaw Arboretum. The purpose of all courses in the Pitzman Nature Program is to educate children in the ways of the earth through actual experience; through experiments with solar energy, cultivation of desert plants, harvesting wild food; through exploration.

In addition to the Pitzman Program, the Garden offers a unique opportunity for students to learn about a culture different from their own, in the Japanese Summer Program, created through a grant from the National Endowment for the Humanities. Students will learn the arts of haiku, ikebana, oragami and bonsai. Through film, lecture and tour of the Japanese Garden, they will learn the symbolism, history and legends of the Japanese people. Persons interested in Summer Youth Programs should contact the Education Department at 577-5140.

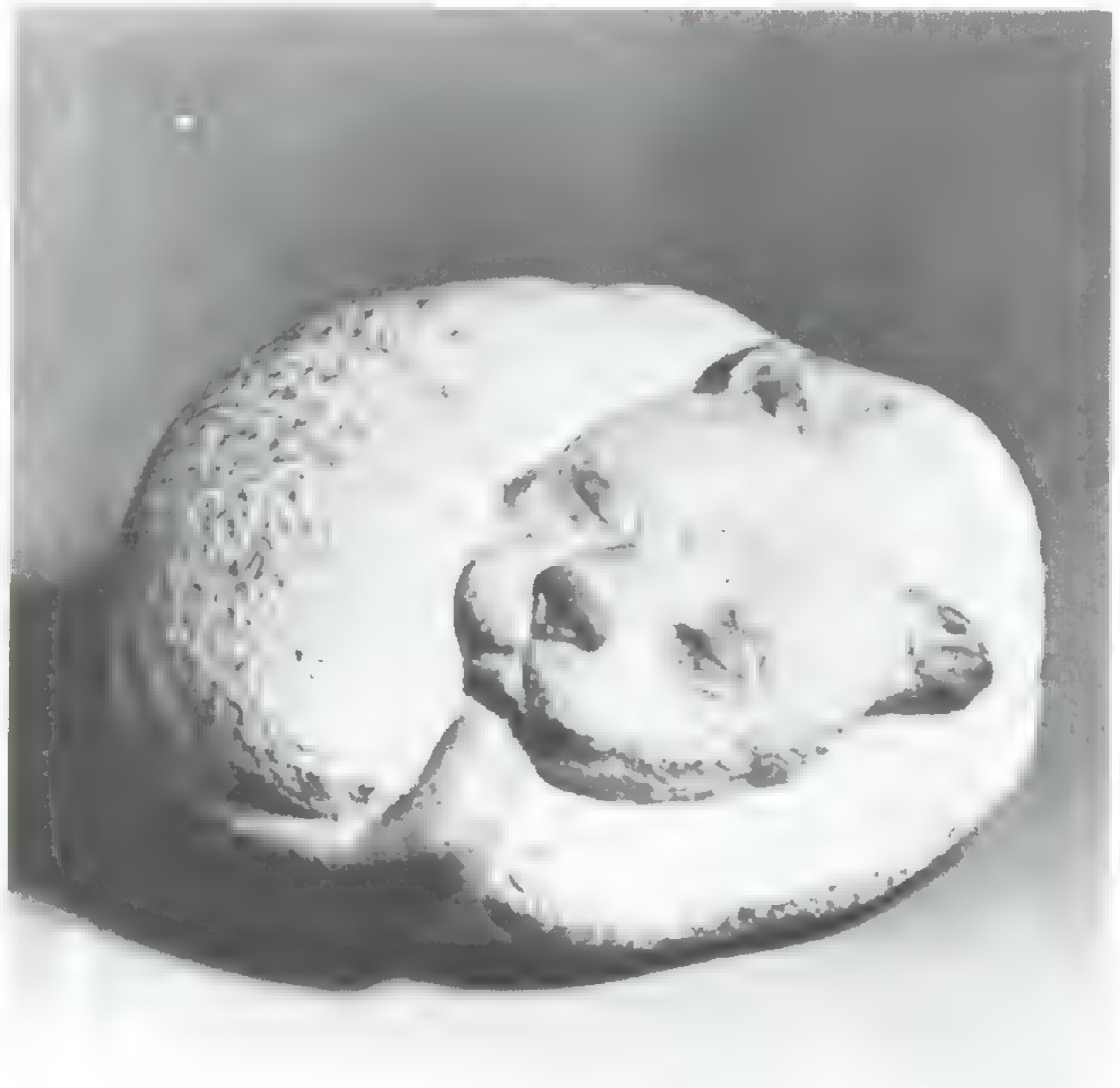
Shaw Bench Reproductions Available

In 1883, Henry Shaw purchased "[wrought] iron park seats" from Shickle, Harrison and Company of St. Louis. About the benches, *Antiques* said, "Birds, floral devices, and gracefully flowing plant tendrils from a medallion of neoclassical inspiration. An example of fine quality produced in a city where cast-iron-fronted architecture was, until recently, an important part of the river front."

The Garden recently commissioned *Southern Heritage, Ltd.* of Birmingham, Alabama, to produce a limited number of reproductions of these century-old benches. The benches, samples of which are displayed in the Plant Shop and the Linnean House, may be purchased from the Plant Shop for $1,875 each. Cost of delivery is extra.

Tower Grove House Summer Luncheon

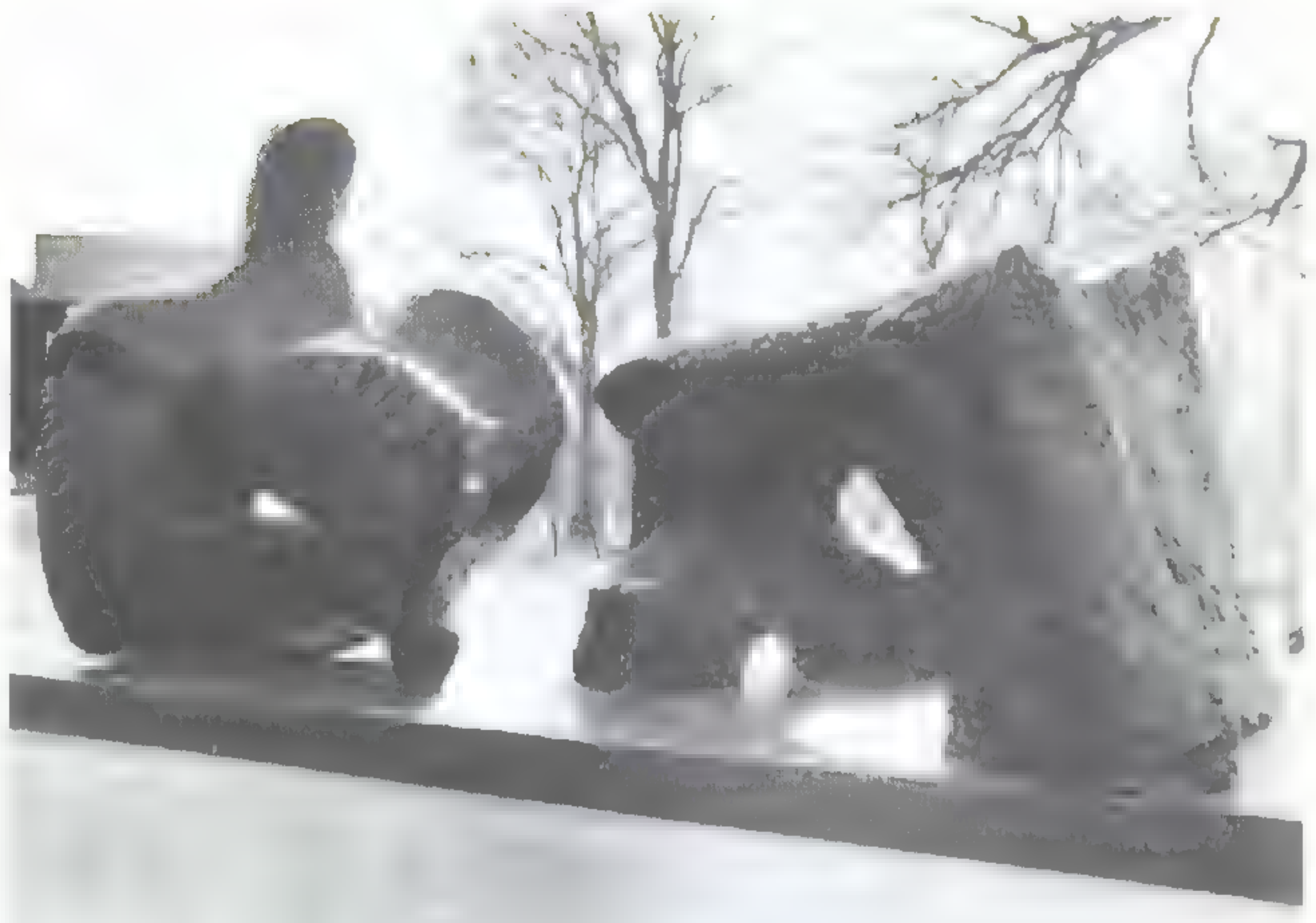
The Tower Grove House Tea Room will offer a summer menu—chicken salad or fruit plate—beginning May 1. The Tea Room is open Tuesday and Thursday by reservation only, which must be made twenty-four hours in advance. Price of the luncheon is $5.50; there is no tax. Individuals and groups of less than fifteen who come to the Garden to have luncheon in the Tea Room will pay a reduced admission rate of $2.25 at the Main Gate. Members of the Garden are free. For groups of fifteen or more, the Garden's standard reduced admission rate is $1.85. For Tea Room reservations, please call Jane Coultas, 577-5150.



Sleeping Cat, Marie Taylor

Marie Taylor Sculpture Exhibit

The work of St. Louis sculptress Marie Taylor will be exhibited in the Linnean House on May 2 and 3, 10 am-4 pm. Reproductions of her most famous piece, Sleeping Cat, will be available, by special order, through the Garden Gate Shop for $60 (Members, $54).



"Two Piece Reclining Figure No. 2"
".....I realized I was simplifying the essential elements of my reclining figure theme. It's a metaphor of the human relationship with the earth, with mountains and landscape."—Henry Moore

Moore Sculpture Moved

"Two Piece Reclining Figure No. 2," a Henry Moore bronze sculpture that had been located near the Main Gate, was moved to the north side of the John S. Lehmann Building, near the English Woodland Garden. Since 1969, the bronze, with a companion sculpture, "Two Piece Reclining Figure No. 1" had framed the view of Tower Grove House from the lily pools. "Piece No. 1" was transferred to the new Sculpture Terrace at the St. Louis Art Museum.

The two bronzes were brought to St. Louis in 1961 by Mr. and Mrs. Howard F. Baer, and installed at Lambert Field. Because of the volume of traffic there, Mr. Baer felt the pieces could not be adequately appreciated and he requested they be transferred to the Art Museum in 1969. At the time, the Museum did not have an appropriate area for them, and they were moved again, to the Garden.

Arts Group Seeks Members

Missouri Citizens for the Arts, the year old arts advocacy organization, is currently soliciting new members.

MCA seeks to promote the arts in the state by working with legislators, businesses, foundations and individuals on behalf of the Missouri Arts Council, the source of state funding for the arts. The Garden is one of the organizations and institutions which benefit from the Missouri Arts Council.

Persons interested in supporting M.C.A. may write to them at P.O. Box 14119, St. Louis, MO 63110.

Winter Photography Contest

Four first-prizes and ten honorable mentions were awarded by the judges in the Garden's winter photography contest.

First-prize winners were Linda Newman in the category of color, senior division (21 and over); John Schwent, for color, junior division (under 21); Melanie Bascom, black-and-white, senior division; and Mev Puleo, black-and-white, junior division.

Honorable mentions in color were awarded to George Hasegawa, Linda C. Yust, Charles Sherwin and Ralph Newman, in the senior division, and March E. Bauer in the junior division.

In black-and-white, honorable mentions went to Al Hollon, Robert Peterson, Bill Hartman and Randi Knofsky in the senior division, and Barbara Blain in the junior division.

Judges were Mrs. Robert H. Kittner, President of the Executive Board of the Members; Kristin Peterson, a St. Louis professional photographer; and Gene Knackstedt, Vice-President of Shaw Camera, Inc.

Haiku Exhibit

Haiku is a traditional Japanese poetic form of seventeen syllables in three lines, the first line containing five syllables, the second, seven, and the third, five.

In connection with the Japanese Festival, the Garden will present a Haiku Exhibit in the Climatron, with approximately 100 plants displayed with appropriate haiku, from June 14 through July 14.

The photographs at left, captioned by haiku, are the four first-prize recipients in the Garden's winter photography contest held earlier this year.

the windows frosted
sound of wind in barren trees
and the ice shining
Conflicts
Mr. John Schwent

the trees still barren
thin rings of ice melting
ground fresh with dank leaves
Untitled
Mrs. Melanie Bascom

hillside and hedgerow
the tree stark against the sky
pond's mouth growing small
Patterns
Ms. Linda Newman

where the stream bends left
no bird sings in the willow
alone on the bank
Untitled
Ms. Mev Puleo

Haiku by William York

Ken Peck Departs

After nearly a quarter of a century of service in the Garden's Education Department, Kenneth O. Peck resigned in late February to accept the position of Technical Adviser at the Hummert Seed Co. He joined the Garden's staff in August, 1957, and saw the number of students participating in educational programs increase from a few hundred in 1957 to approximately 40,000 in 1980. He was instrumental in the creation and development of several popular programs, including the Pitzman Nature Program, Saturday Morning Activities and the Plant Science Program for elementary and high school students.

"I've seen quite a bit of change in the Garden and in education since starting here," he said. "Working here was a tremendous experience for me; it was always interesting and exciting. I'm very fond of the Garden and its people and look forward to a long, continued association with it."

Ken Peck will return periodically as a guest lecturer and instructor for the Education Department.

Japan Tour Scheduled For October

The Japan American Society of St. Louis will sponsor a fifteen-day cultural tour of Japan in October. Departing from St. Louis on October 10, the tour will visit Tokyo, Mt. Fuji, Suwa (Sister City of St. Louis), Kyoto and several other cities and villages.

Persons interested in further information or in joining the tour should contact Kikue Atkins of the Japan America Society at 469-3065.

Calendar

May

May's warm slow yellow moonlit summer nights—Robert Browning

May 1-2	**Marie Taylor Sculpture Exhibit:** Linnean House, May 2-3, 10 am-4 pm. Unique sculptures in a whimsical display.
May 1-9	**Mammillaria Display** (with jojoba): Opens on May 2, Desert House, 9 am-5 pm (through May 24).
	Jack Jennings Photography Exhibit: Opens on May 4, John S. Lehmann Lobby, 9 am-5 pm (through May 29). A photographic celebration of four seasons in the Garden.
	American Red Cross Day: May 9, John S. Lehmann Building, 9 am-6 pm. Exhibits in honor of 100 years of the American Red Cross.
May 10-16	**Mammilaria Display** continues
	Jack Jennings Photography Exhibit continues
	Mother's Day at the Garden: May 10, Main Gate, 9 am-6 pm. A nice day for anyone's mother. Rose Society Miniature Rose sale.
	St. Louis Horticultural Society Show: May 16-17, John S. Lehmann Building, 2-5 pm on May 16; 9 am-5 pm on May 17. The Society's 53rd Annual Show.
	Dahlia Society Plant Sale: May 16-17, Visitors' Parking Lot and Main Gate, 9 am-6 pm.
May 17-23	**Mammilaria Exhibit** continues
	Jack Jennings Photography Exhibit continues
	St. Louis Horticultural Society Show: Last day, May 17
	Dahlia Society Plant Sale: Last day, May 17
May 4-31	**Mammilaria Exhibit:** Last day, May 4
	Jack Jennings Photography Exhibit: Last day, May 29
	Israeli Festival: May 4, Grounds & John S. Lehmann Building, 11 am-4 pm.
	Rose Society Show: May 30-31, John S. Lehmann Building 9 am-6 pm. "The mystic, the improbable, the Rose"—H.P. Putman
	Opuntia Exhibit: Opens May 30, Desert House, 9 am-5 pm (through June 20).

June

And what is so rare as a day in June?
Then, if ever, come perfect days—James Russell Lowell

June 1-6	**Opuntia Exhibit** continues
	Members Rose Evening: June 5, Rose Gardens, 6-8 pm.
June 7-13	**Opuntia Exhibit** continues
	Japanese Festival: Opens June 13, Garden grounds, 9 am-6 pm (through June 21).
June 14-20	**Opuntia Exhibit:** Last day, June 20
	Japanese Festival continues
	Haiku Exhibit: Opens June 14, Climatron, 9 am-5 pm (through July 14).
June 21-30	**Japanese Festival:** Last day, June 21
	Haiku Exhibit continues

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Missouri Botanical Garden Gate. Photographed in 1907 by William Trelease, the first Garden Director after Henry Shaw. A limited edition reproduction of this photograph was presented to each of the Henry Shaw Associates at their annual dinner in 1980, in gratitude for their significant support of the Garden.

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Marks On Paper

The written word remains.—Horace

Jim Reed opens the book carefully and lays it onto the table, showing a color plate of *Allium lusitanicum,* from root to fine, pink flower. Opposite the plate is a brown sheet of paper printed with a ghost of the *A. lusitanicum.* "This is the printer's proof of the plate," Reed says. "This book is one of only two known copies that include the black-and-white printer's proof of all engravings." The book is one volume of *Les Liliacees* by P. J. Redouté, printed in 1809, and commissioned by Empress Josephine who was Redouté's patroness.

Turning the pages of *Les Liliacees,* Reed, the Garden's librarian, emphasizes the careful accuracy of each of the engravings. "Redouté used stipple engraving to get the detail necessary for accurate botanical illustration." Stippling is a process of using tiny dots close together to produce subtle gradations of light and shade. The work of Redouté is among the most highly regarded in the history of printing, because of the care he took in the creation of each piece.

There are many volumes like the Redouté in the rare book collection of Missouri Botanical Garden; books with handpainted plates, precise drawings. Some are displayed n cases, open showing illustrations of herbs, a rose, a woodcut of a medicinal plant, a single page from a fifteenth-century manuscript, Book of Hours. This last is the oldest item in the collection. "We have it not for its religious value," says Reed, "but because it was illuminated with floral devices." These are the items that Reed and his staff show to visitors who tour the rare book rooms; the Redouté, he display cases, a novel item—*Hortus Gramineus Woburnensis,* published in 1816, and illustrated with actual dried plant specimens pasted into the book—pieces visually exciting, with histories of intrigue, success, failure, deceit. Taking a book from the shelf, Reed says, "The earliest illusrated herbal we own is the *Latin Herbarius,* printed in 1484. t's in its original dogskin binding; text in Latin. It was printed by Peter Schoeffer, whose father-in-law drove Gutenberg into bankruptcy." Johann Gutenberg had borrowed money from Johann Fust to establish his press. Fust demanded payment before Gutenberg had realized any fruits from his invention, and when Gutenberg was unable to pay, Fust confiscated the press, establishing his own firm. Ten years later, Fust was dead from the plague and Schoeffer inherited the business.

Anecdotes and fine, attractive plates are interesting but it is not for these that the collection exists.

"One of our most important collections is of nineteenth-century German high school programs. We have several hundred of these. They have not much financial value; they're printed on cheap paper and not at all visually attractive."

Where is their value; why are they important?

Jim Reed sips coffee and continues. "In the nineteenth century, German high schools employed botanists as teachers. The scientists would present papers on their work at graduation ceremonies and the papers would be reprinted in the program. They're of interest to only a small group—taxonomists.

"Our library is important because we have one of the most comprehensive collections of botanical literature in the world; we provide services to scientists in this country and in others. To visiting scientists and science historians, we are important because we have many of the original source materials showing the development of botany. We have hundreds of items that are unique—which are the only copy known to exist on the planet."

First editions of Darwin's *Origin of the Species,* Linnaeus' *Species Plantarum* and Schoeffer's *Gart der Gesundheit* stand on the shelves with 3,500 other works. Schoeffer's book, which appeared in 1485 as a German revision of the *Latin Herbarius,* is one of 1,000 volumes that are the pre-Linnean collection (those written prior to 1750), the basis of the entire rare book collection. Most of those 1,000 books were given to the Garden in 1892 by E. Lewis Sturtevant, a nineteenth-century physician and agricultural scientist. Sturtevant was prophetic when he, commenting on his gift, said, "I have a strong desire that the library will serve a purpose. The time will come...when attention will be given to the problem of the changes that mankind have *[sic]* effected in plants."

Over one-half of the rare book collection, approximately 1,800 volumes, is the Linnean collection: books by and about Carl Linneaus, including those on botany, zoology, medicine and poetry. "Linneaus was a great scientist," says Reed, "but his poetry is not very good." That collection

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Comment

For almost half a century, the Garden has been concentrating its research effort on the tropical and semitropical areas of South America, principally Peru, Ecuador, Colombia, and Venezuela. We are now initiating an active program in Bolivia and, to some extent, Paraguay; Dr. James C. Solomon, the first recipient of the William L. Brown Fellowship, generously donated by Pioneer Hi-Bred International to the Garden recently, will begin a residency in La Paz, Bolivia, this month to study the plants of that country. The tropical flora of Bolivia and of Paraguay differ from those of Peru, Ecuador, Colombia, and Venezuela, resembling rather much of the flora of northern Argentina, which I visited for two weeks in May. Because of the rapid destruction of the tropical regions there, it is vital for us to greatly increase our efforts for research coordination with the many botanical institutions and botanists of Argentina.

On my visit, I traveled first to Tucumán, where the meetings of the Botanical Society were held. A full three days of outstanding papers emphasizing many subjects of direct interest to the Garden were presented. I opened the conference with a lecture on the role of continental movements on the distribution of plants, and closed it with a paper on the destruction of tropical forests and the reasons that Argentina, like the United States, ought to have a real and substantial interest in the fate of these forests, because of national self-interest. At the conference, most of the botanists in Argentina were gathered and I was able to renew acquaintances with many whom I had met over the past 25 years. I was deeply honored with the presentation of a Honorary Membership in the Argentine Society of Botany which I ac-

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Director

Bath, Parish of St. Thomas, Jamaica

"Jamaica is more than a beach: It's a country" say the tourist posters in the airport, hotels, and shops. In fact, though this is my fourth trip to Jamaica, I can recall only one visit to a beach: In 1963 our plant collecting group camped on some north-shore beach because it was the flattest piece of ground we could find. When I think of Jamaica, I think of rainy, cloud enshrouded mountains, where the trees and ground below them are covered with mosses. The reason I have come to Jamaica this time is to collaborate with Dr. William R. Buck of the New York Botanical Garden who is beginning a project to write a moss flora of the entire West Indies. He is beginning his project by visiting the islands of the Greater Antilles—Jamaica, Puerto Rico, Hispaniola, and, he hopes, Cuba. Since he had not been to Jamaica before, he invited me along to guide him to some of the more interesting spots for mosses. Over 300 species of mosses have been reported from Jamaica, starting in the late 1700s when Olaf Swartz reported a few in an early flora of the West Indies. While these 300 or so species are preserved as thousands of herbarium specimens, it is important for Dr. Buck to see the mosses in their native habitats to prepare proper descriptions of them and to be able to discuss them in his forthcoming flora.

Our three-week trip to Jamaica has begun with a visit to the Bath area here on the southeastern end of the island, near the southern end of the John Crow mountain range.

Jamaica has several botanical gardens, and the oldest is at Bath. It was founded in 1779, some 80 years before the Missouri Botanical Garden. At that time, the population of Jamaica was well over 200,000—the overwhelming majority of these were slaves—while the population of St. Louis was only a little over 1,000. The Bath Botanic Garden was established as a plant introduction center, and it was here that the breadfruit was introduced to the West Indies in the late 18th century by Captain William Bligh of *Mutiny on the Bounty* fame. The size of the garden has been decreased to only a few acres now and it really is no more than a public park, though it does contain many interesting, exotic tropical trees.

The other interesting feature of Bath is the hot mineral spring which was first discovered in the early 1700s by a runaway slave. Soon thereafter a public bath was established, and generations of Jamaicans have come here for the "cure." A large hotel, run by the Jamaican government, now straddles the Sulphur River, into which the hot mineral springs flow. Since the site is only about a mile from the botanical garden and since both places have been active for well over 200 years, it is not surprising to find many exotic plants now naturalized along the steep valley walls of the Sulphur River. In fact, as I sit on the balcony of the hotel and write this letter, I can look directly across from me at the heavily vegetated valley wall and am reminded of the beautifully painted ceiling of the Museum Building at the Garden. That ceiling contains paintings of an improbable mixture of the world's flora: no one would expect to find many of the plants shown growing together on our Museum ceiling actually growing together in nature or even under cultivation. But the walls of the Sulphur River valley certainly approach it in their colorfulness and diverse origin of the plants growing there.

—Marshall R. Crosby, Director of Research

Operation Clean Stream

The fourteenth annual Operation Clean Stream, sponsored by The Open Space Council of St. Louis and Monsanto, is scheduled for Saturday, August 29. For the second year, Shaw Arboretum will participate in the project, which is an effort to clear debris from the Meramec River. Persons interested in joining Operation Clean Stream should meet at the Arboretum at 9:30 a.m. on the 29th; they should bring canoes, paddles, life jackets and lunches. The Arboretum provides beverages. For further information, contact The Open Space Council at 727-2311, or the Arboretum at 577-5138.

Progress in the construction of the ***Visitor Center*** *continues. The Center will be completed by the end of 1981 and will open in spring of 1982, as originally scheduled.*

Directory

Missouri Botanical Garden has completed the first national directory listing names of people who are experts on the germination and culture of wildflowers. *The Directory to Resources on Wildflower Propagation,* by Gene Sullivan and Richard Daley, was supported by the National Council of State Garden Clubs as part of their program, "Operation Wildflower," the purpose of which is to stimulate interest in the use of native plants for roadside plantings.

More information on the Directory can be obtained from the National Council of State Garden Clubs, Inc., 4401 Magnolia Avenue, St. Louis, Missouri 63110.

Tax District Bill Passes

In May, the Missouri House of Representatives approved Senate Bill 48 providing for the establishment of a botanical garden subdistrict of the Zoo-Museum Tax District. The vote in the House was 139 to 15; the bill was previously approved by the State Senate. After the measure is signed into law by Governor Christopher Bond, it must be approved by voters in St. Louis and St. Louis County before the Garden will receive funds through the District.

Comment

(continued from page 2)

cepted on behalf of the Garden and all who are working here in connection with our outstanding efforts in tropical botany.

After the conference, I was able to visit centers in Cordoba, Buenos Aires, and La Plata, presenting lectures and visiting with scientists at these centers. My chief host in Argentina was Ing. Agr. Armando Hunziker, President of the Argentine Society of Botany this year, and Professor at the University of Córdoba. Armando is the brother of Dr. Juan Hunziker, who is a professor in the School of Agronomy at the University of Buenos Aires and who is studying here at the Garden and Washington University for 10 months as the holder of his third Guggenheim Fellowship, an almost very rare award.

My trip to Argentina was a fine success, not so much for the opportunity to meet and talk with so many botanists about important issues, but for the possibilities arising from this visit, of the future exchange of personnel, ideas, specimens and materials. As we attempt to understand the tropics, in the limited time remaining before their virtual disappearance, it is important that we continue to cooperate with scientists of all countries, sharing our resources, to ensure the accomplishment of this significant work.

Peter H. Raven

Marks On Paper

(continued from page 1)

is one of the three largest such collections in the United States; the other two are at the Hunt Botanical Library in Pittsburgh, Pennsylvania, and the University of Kansas in Lawrence.

The other approximately 700 volumes in the collection include post-Linnean botanical works, horticultural works, and historical works. There are also a number of travel and exploration narratives, written between the sixteenth century and the present. "These are important historically, but are important to us because they contain descriptions of plants that were collected," Reed says.

Luck and perseverance; that's how they're collected—the books.

Sometimes there are rumors: a book thought not to exist turns up. "C.H. Grey published a work, *Hardy Bulbs,* in 1937. We had volumes one and two. Almost every copy of volume three was supposed to have been destroyed when the publisher's warehouse was bombed during the war. Someone told me they had heard that a few copies of volume three survived. I spent four years looking for that volume and finally found it. Along the way, I found the author's galley proofs for all three volumes, with corrections. We have those, also." Perseverance.

And luck. "One day, someone showed up with a copy of Mattioli's commentary on Dioscorides, an edition published in 1565. He had found it in his attic and just gave it to us." Dioscorides was a first century Greek physician who was a slave to the Roman army; he described plants he found on his travels with them. Mattioli interpreted Dioscorides, determining to which plants Dioscorides referred.

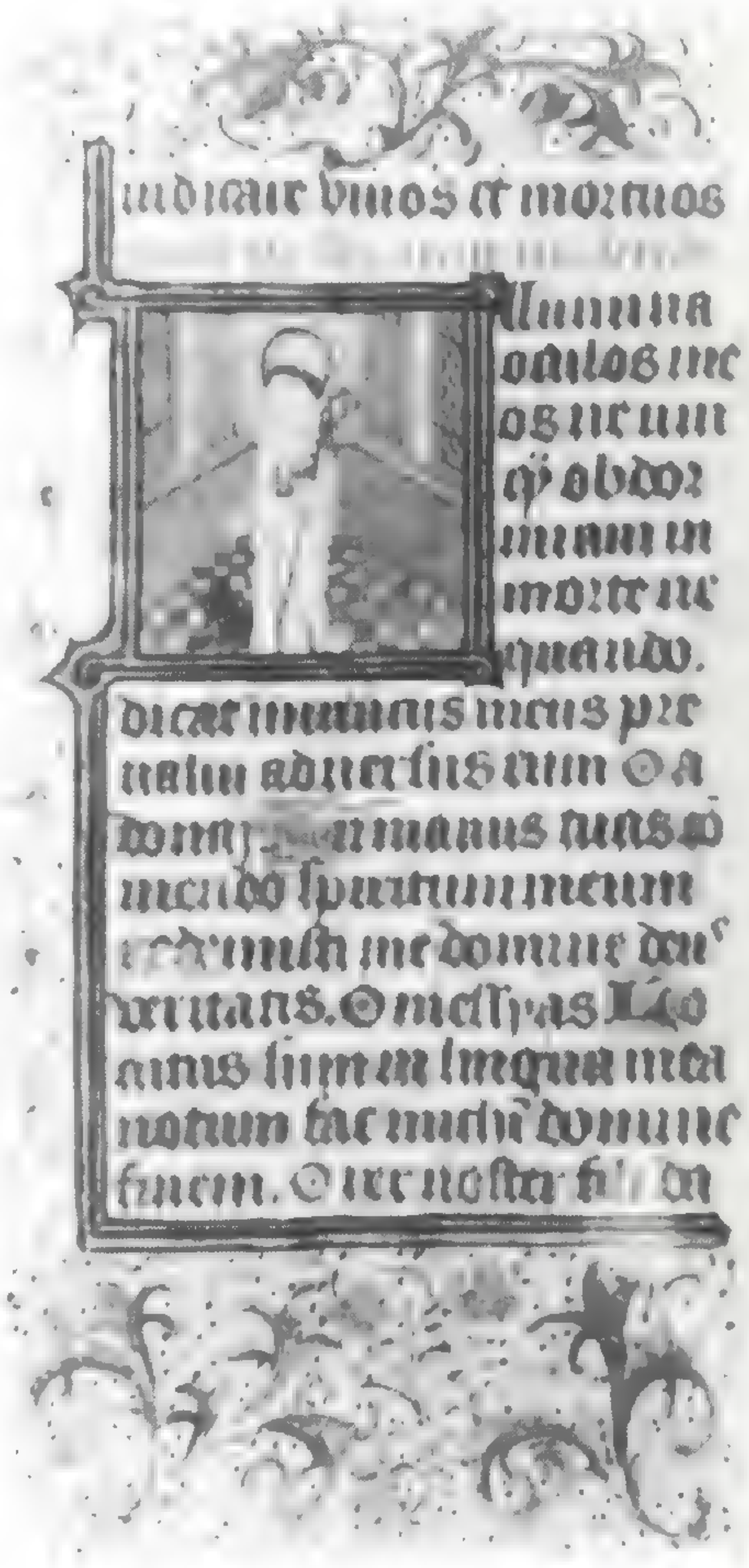
"Most of the books we purchase through catalogues and lists provided by book dealers," Reed says. On his desk are piles of catalogues from New York, London, Amsterdam, Philadelphia. I've seen Reed scanning them while he waited in line at the Greenery, the Garden's restaurant, taking a pencil from his pocket to mark an item that would be appropriate for the library. "If an important piece appears, we try to acquire it if it is reasonably priced." Reed also visits bookstores, advertises in trade journals, and looks for private collections offered for sale to acquire books. "About two years ago, we bought the private library of William Campbell Stere, who was the former director of New York Botanical Garden. He had a large collection of books and pamphlets on mosses published from 1750 to the present.

"A lot of botanists, even though they're not associated with the Garden, who find books offer them to us. They consider us such an important institution to the international botanical community, they think of us when they are out collecting or when they see a book somewhere."

During the autumn months, the Garden's library will host "Lines and Curves; Paper and Ink: A Festival of the Book Arts," a series of exhibitions, lectures and workshops on various aspects of creative book-making. The Festival begins in September with an exhibition of bookbindings to celebrate the 75th Anniversary of the Guild of Book Workers. Other exhibitions scheduled for later in the fall include a display on the art of the wood engraver; an exhibition on the botany of papermaking and accompanying displays of unusual and handmade papers; a bookplate display; an exhibition of calligraphy and type designs by Herman Zapf; and the Garden's own exhibition on the history of botanical illustration.

Accompanying these exhibitions, the library has scheduled a variety of public lectures and educational workshops by nationally known authorities on topics such as papermaking by hand, bookbinding, publishing, fine printing, calligraphy, book illustration, book collecting and other aspects of the book arts.

Further details will be announced in the next issue of the *Bulletin.* Members interested in participating in any of the workshops may call the Garden's library at 577-5155 to receive mailings about the planned events.



Gardening In St. Louis

Hot, dry days of July and August can be devastating to plants in your garden. Try following these guidelines to help your plants beat the heat.

1. **Mulch to conserve water.** A mulch is anything which covers the ground around plants and between rows. Mulching conserves moisture in the soil by reducing the rate of evaporation. Mulch also greatly reduces the presence of weeds, which compete with your plants for precious water and nutrients.

Many organic materials may be used as mulches. You may try a 3- or 4-inch layer of grass clippings (let the grass dry a bit before applying to the garden), straw, partially decomposed leaves or compost. A layer of several sheets of newspaper works effectively if weighted down with a top layer of soil or other material.

Plastic mulch also works well, is easy to use, and is reusable for several seasons. Plastic mulch, when applied in the spring, keeps the soil warmer and gives summer crops, like tomatoes and peppers, a faster start.

2. **Use shade to advantage.** Moisture evaporates more slowly in shaded soil than in sun. Leafy vegetables such as cabbage, lettuce, spinach, and Swiss chard do well in partial (not complete) shade—that is, areas which receive full sun for only part of the day. Basil, mint, parsley, and tarragon are a few herbs that thrive in partial shade. Fruiting vegetables such as tomatoes, peppers and vine crops need full sun for satisfactory production.

3. **Space plants closely.** Space plants and rows so that the maturing plants just overlap. This will shade the ground to reduce moisture loss and weed competition. If you use a mechanical cultivator, you may need to switch to hand cultivation in the narrower rows.

4. **Harvest young.** Pick your vegetables when they are at their prime—don't let them over-ripen. Picking reduces the moisture requirements of the plants and encourages continued production.

5. **Weed regularly.** Weeds compete with vegetable crops for every drop of water—and often the stronger, deep-rooted weeds win the competition! Remove the weeds as soon as they show themselves in your garden.

6. **Water deeply, not often.** Water in the evening or early morning. Use special soil-soaking hoses which allow water to drop slowly into the ground, and place the hoses quite close to your plants. Or set your garden hose, nozzle removed, directly on the ground to irrigate one part of your garden at a time. Let the water run slowly for as long as necessary to soak deeply into the soil. A deep soaking is needed only every 10 to 14 days, unless your plants show signs of wilting from insufficient moisture. Remember that oscillating-type lawn sprinklers, if used, throw water where you may not need it and allow more evaporation than other watering methods.

7. **Provide windbreaks.** Strong or constant winds speed evaporation. If your garden is fairly small, it may be possible to set up a temporary windbreak using fencing materials or cast-off construction materials. Just be sure windbreaks do not shade plants that need full sun.

—Steven A. Frowine, Chairman, Indoor Horticulture

Pine Wilt Disease Afflicts Trees

Pine wilt disease is a newly recognized problem of pine trees, especially ornamental species such as Scotch or Austrian pine. It is a major problem in pine forests of Japan now, having reached epidemic status in certain areas of that country where extensive forest plantations of Japanese red *(Pinus densiflora)* and black *(P. thunbergii)* pine have been severely damaged. It was rediscovered in Columbia, Missouri, in 1979 and is presently known in thirty-two states of the U.S., affecting nineteen species of pine.

The cause of the disease is a microscopic animal that lives in the resin canals of pine trees. These organisms are carried from infected to healthy trees by wood-boring beetles. The insects lay their eggs under the bark of pines in the summer or early fall, usually selecting trees that are under stress from various causes, including this disease. The egg develops into a grub that tunnels in the wood and overwinters to emerge as an adult the following year. If the tree has nematodes, these invade the beetles as they emerge and travel along when the insects fly to healthy trees for their feeding. The beetle strips the bark from growing tips; the nematodes migrate into the tree, multiply to large populations and kill the pine. Trees that look perfectly healthy may wilt rapidly, lose color and die within a few weeks.

What can be done? Research on this problem in the U.S. is just beginning. If you suspect that your tree has died suddenly from pine wilt, and if it retains its needles, contact **Mr. Frank Rycek, State Department of Agriculture, Plant Industries Division, P.O. Box 630, Jefferson City, Missouri 65102,** for analysis of a sample to confirm that your tree has pine wilt disease. Then cut and burn the wood, including branches. Dig up the stump and dispose of it as well. *Do not put wood from a diseased tree into a wood pile.* The beetles will complete their life cycle and fly to healthy trees. We do not yet know how to protect healthy trees from this disease but hope to find a way by learning as much as possible about the association of nematodes, beetles and trees.

—Dr. V.H. Dropkin
Department of Plant-Pathology
University of Missouri-Columbia

From the Members' Office

Members' Board Names New Officers

Mrs. Shadrach F. Morris, Jr. was named as President of the Executive Board of the Members at the Board's May meeting. She succeeds Mrs. Robert H. Kittner, who was President from May, 1979. The Board also named Mrs. Bernard C. Brinker as First Vice-President, Mrs. Rudyard K. Rapp as Second Vice-President, Mrs. W. Ashley Gray III as Treasurer, and Mrs. Henry C. Lowenhaupt as Secretary.

The Executive Board of the Members was founded in 1964 to promote Garden membership and to plan and provide activities for Members, including flower show preview parties, lecture series, Members' tours and special events.

Mrs. Morris said, "Our goals during the next year are to further extend Membership throughout the area and to draw the attention of the community to the Garden and its important work. We will also seek to involve more of our Members in the activities the Garden provides for them."

Mrs. Rudyard K. Rapp (left), Second Vice-President; Mrs. Bernard C. Brinker, First Vice-President; Mrs. Shadrach F. Morris, President; Mrs. W. Ashley Gray III, Treasurer; and Mrs. Henry C. Lowenhaupt, Secretary: the newly-elected officers of the Executive Board of the Members.

Amendments to Henry Shaw's Trust

The St. Louis Circuit Court has, on application of the Board of Trustees of Missouri Botanical Garden, ordered amendments to the Garden's century-old Trust agreement including one allowing the expansion of the size of the Board of Trustees.

"The Missouri Botanical Garden was established for the public good by the will of its founder, Henry Shaw," said C.C. Johnson Spink, President of the Garden's Board. "The Trustees petitioned the Court to amend the Trust created by that Will to adapt the Garden to changing circumstances and new developments in urban life."

Johnson explained that the petition was filed because of the Board's feeling that membership in the Board of Trustees should be broadened and that technical changes were important to provide the Board with modern, effective management tools and policies designed to improve the efficiency of Garden management.

"Things have changed dramatically since the Garden was a half-day's ride on horseback from downtown," Spink said. "The world of Henry Shaw is not the world of the Missouri Botanical Garden in 1981. We felt we needed to operate under a modern trust document, empowered to employ modern business procedures to ensure the continued greatness of the Garden."

Amendments to the Garden's original indenture of Trust, granted by the Court in its decision, include:

1. A provision adding up to ten Trustees, to be elected by the existing Trustees, for fixed terms.
2. A provision appointing the President of St. Louis University as an additional *ex officio* member of the Board. Current *ex officio* members include the Chancellor of Washington University, the Bishop of the Episcopal Diocese of Missouri, the President of the Public Schools of the City of St. Louis, the President of the Academy of Science of St. Louis and the Mayor of the City of St. Louis.
3. A number of provisions empowering the Board to manage the affairs of the Garden according to sound, accepted and contemporary business principles.

Spink said, "The definition of our responsibilities toward the Garden included in Shaw's will—having 'for the use of the public a botanical garden forever kept up and maintained'—remains our responsibility today. And we must recognize that as the world changes, our needs and the needs of the Garden change with it."

Thomas R. Fitzgerald, S.J.

Fr. Fitzgerald Appointed to Board

On April 30, as a result of the Circuit Court's approval of amendments to the Deed of Trust governing the Garden, the Reverend Thomas R. Fitzgerald, S.J., President of St. Louis University, was named an *ex officio* member of the Board of Trustees. In making the announcement, Board President C.C. Johnson Spink said, "We have a long history of close cooperation with St. Louis University. Father Fitzgerald's joining the Board will serve to strengthen the bond between our two institutions; we look forward to the contribution he will make to the Garden through his active participation."

Responding to his appointment, Fr. Fitzgerald said, "I'm happy to become a member of the Board because there is already close collaboration between the Garden and the University, specifically through the number of graduate students performing research in the Garden's Botany Department. Second, both our institutions serve St. Louis."

Over the past quarter century, members of the Garden's botany staff have served as professors and adjunct-professors for the graduate botany program at St. Louis University. Presently there are five students working toward a graduate degree from SLU through the Garden.

Fr. Fitzgerald has been President of St. Louis University since 1979. Prior to that, he was President of Fairfield University in Fairfield, Connecticut, from 1973 until 1979, and Academic Vice-President of Georgetown University in Washington, D.C., from 1966 to 1973.

New Coordinator of Membership Services

Patricia A. Arnold was recently appointed Coordinator of Membership Services. She was previously Director of Volunteers for the Thomas F. Eagleton Campaign Committee and Director of Field Services for the Cystic Fibrosis Foundation. She is a graduate of the University of Missouri-Columbia.

As Coordinator of Membership Services, Mrs. Arnold will assist in the development and implementation of membership activities and programs; she will function as liaison between the Executive Board of the Members and the Garden's staff, and will assist members in their use of Garden services.

Patricia A. Arnold

C. C. Johnson Spink (right), President of the Garden's Board of Trustees, presents ***Mrs. Robert H. Kittner*** *with a gift in appreciation of her service as President of the Executive Board of the Members.*

Peter H. Raven (left), Garden Director, and C. C. Johnson Spink, President of the Board of Trustees, present a painting of the Japanese Garden, by artist James G. Scott, to ***Tom K. Smith, Jr.,*** *the immediate past-President of the Board. The presentation was made on behalf of the entire Board to honor Mr. Smith for his six years as President. It was during Mr. Smith's tenure that the Japanese Garden was opened.*

Schoemehl Is *Ex Officio* Trustee

Following his election in April as Mayor of the City of St. Louis, Vincent C. Schoemehl, Jr. joined the Garden's Board of Trustees as an *ex officio* member. According to the terms of Henry Shaw's will, the Mayor of St. Louis, by virtue of his office, is a trustee of the Garden.

Members are invited to bring their children to celebrate the 181st birthday of Garden founder, Henry Shaw, on Friday, July 24. … The details of special activities in honor of the day will be announced later.

NEW MEMBERSHIP

April and May 1981

New Sponsoring Members

Dr./Mrs. Clarence Weldon
Mr./Mrs. Louis I. Zorensky

New Sustaining Members

Ms. Anna Ballmann
Mr. A. J. Bardol
Mrs. H. L. Barthels
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Dr./Mrs. Richard S. Sohn
Mr./Mrs. William Stern
Mr./Dr. Joseph M. Touhill
Ms. Jane Walther

New Contributing Members

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Mrs. Mae Allen
Mr./Mrs. Raymond Armstrong
Mrs. William Milton Bahr
Mr. Gary Baker
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Mr./Mrs. Walter W. Dalton
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Mr./Mrs. Jack C. Derington
Miss Bertha Deutsch
Mr./Mrs. Carl J. Deutsch
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Mr./Mrs. Gerald R. Diehl
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Dr. Robert M. Donati
Mr. Austin Doyle
Mr./Mrs. David Drinkard
Mr./Mrs. Fredrick H. Eickhoff
Mr./Mrs. Robert A. Emnett
Miss Margaret L. Erby
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Mr./Mrs. James E. Fischer
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Mr. Jerome D. Fortenberry
Mr./Mrs. John H. Forest
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Mr. Darin Buhr Groll
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Mr./Mrs. Russell R. Hopmann
Mr. E. Hopper
Mrs. Betty Horton
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Mr. Gene Koshner
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Mr./Mrs. Lawrence Langsam
Mr./Mrs. Keith D. Laughbaum
Mrs. Ray W. Linnemeyer
Mr. Kent Lion
Mr./Mrs. John Lively
Mrs. Nellie Loane
Mr./Mrs. Michael J. Luepke
Mr./Mrs. Frances R. Lynch
Mr./Mrs. Gordon MacConnell
Mr./Mrs. Mark J. Malley
Mr./Mrs. Ronald W. Maret
Mrs. David Marrs
Mr. Jeffrey L. Marsh
Miss Mildred L. Mattes
Mr./Mrs. John E. Max
Mr./Mrs. Toy A. Mayo
Mr./Mrs. John McCue
Mr./Mrs. Dennis M. McDaniel
Mr./Mrs. David McDougal, Jr.
Mr./Mrs. Robert McGlaughlin
Mr./Mrs. John R. McGregor
Mr. J. Speed Medart
Mr./Mrs. Edgar Meinhardt

(continued on back page)

Gift of Lackland Resolution to Archives

The Garden's archives recently received, as a gift from Marie Taylor, a resolution passed by the Board of Trustees on February 9, 1910, to Mr. Rufus J. Lackland, first Board President, expressing their appreciation for Mr. Lackland's years of service. The resolution reads in part:

When this Board organized in 1889, you were the unanimous choice of its members for the office of President...You may rest assured that the community appreciates your work, and rest assured further that...posterity will accord to you no small degree of credit for such happy result.

Rufus J. Lackland, who served as Board President for nearly 21 years, was born in Poolesville, Maryland, in 1819, the year Henry Shaw first settled in St. Louis. Lackland himself moved to St. Louis in 1835, and began working at Mulliken and Pratt, a commercial house at Market Street and the Levee. Shortly after that he became a clerk on the steamer *Clyde* and spent the next ten years on the river between St. Louis and New Orleans. In 1847 he formed a partnership to open a wholesale grocery, specializing primarily in sugar and produce. In 1871, he was elected president of Boatmen's Bank, serving until his death. He was also a director of the Belcher Sugar Refining Company and President of the St. Louis Gas Company.

During Mr. Lackland's tenure as President of the Garden's Board many significant events occurred, including the relocation of Henry Shaw's townhouse from 7th and Locust to its present site at the south end of the Garden. The south wing of the administration building was also added during his tenure. Many of the policies and practices that have served to make the Garden an internationally prominent facility for research, education and display can be attributed to Lackland's foresight.

Marie Taylor, Mr. Lackland's great-grand-daughter, recalls that her earliest memory of sculpture occurred at the Garden when Mr. Lackland showed her Shaw's mausoleum one day. Although she is unwilling to trace her creative work back to that incident, she has become an internationally recognized artist whose sculptures can be found in the St. Louis Art Museum, the Hirshhorn Sculpture Museum in Washington, D.C., at the Mansion House on the St. Louis riverfront and in many other collections, public and private. Her most recent exhibit, here at the Garden in early May, included a variety of pieces sculpted from her favorite medium of fieldstone. Her work has been exhibited in many museums and galleries in St. Louis, Memphis, New York, Houston, Helsinki, and other cities. —*Jim Reed*

Demonstration Garden Opens

It's the building that you notice first, a small cedar structure with scalloped shingles. It reminds you of a chalet in the Alps. But there are no skiers here, only shovels, hoes, rakes and cultivators. It's a utility structure; a very fancy tool shed.

That shed sits on the edge of a new feature at Missouri Botanical Garden, a Demonstration Vegetable Garden, located along the pathway between the Japanese Garden and the Climatron. The demonstration garden covers 200 square yards.

"We built this to be on a homeowner's scale," says David Goudy, Assistant Director of the Garden. "It's actually a little more ground than a family of four would plant in vegetables, but the intent is to show visitors the types of things they can do with their own backyard gardens."

The demonstration garden was constructed because of response to a survey the Garden conducted in the summer of 1980, which indicated that people were interested in such a display. "The garden," says Goudy, "will give people an idea of the varieties of vegetables that can be grown in our climate. It will also give examples of different cultivation techniques." He points out several small, square plots on the south edge of the garden. "This is a turf demonstration area, which consists of the different grasses that can be used in lawns in this area."

Beyond the western side of the garden are about fifteen small trees; the tallest is no more than twelve feet. "Those are dwarf fruit trees. They have considerable advantages for the homeowner with an average yard. They're smaller than standard-sized trees, so they use less room and are easier to harvest, and still maintain high yields. And for people with even less room, it's still possible to grow fruit trees." Growing along the western fence are several saplings, each no more than thirty inches tall. "These are espalier fruit trees," Goudy says. Espalier is the training of a plant to grow flat against a surface, such as a wall. "We'll let them grow only to the top of the fence (about six inches more)."

"Can three foot trees bear fruit?"

"Yes, but we won't let them bear for several years. Their growth will be concentrated in the branch and root development so that they will be able to support their future fruit crops."

The majority of the garden is planted in traditional crops, peas, spinach, lettuce, onions and cabbage. There are squash, peppers and tomatoes, and perennials, such as rhubarb and asparagus.

"We'll also have displays demonstrating composting, mulching and the necessary tools for gardening. It's designed so that beginners, as well as those who have been gardening for years, can learn something they can apply to their own garden or yard."

The Demonstration Vegetable Garden is part of the Garden's continuing efforts in education, and can be visited during all regular Garden hours.

Funds for the construction of the utility structure were donated by the Ladue Garden Club.

"...I used to bring my daughter..."

When we asked visitors to the Spring Flower Show why they came to the Garden, we received over 4,500 responses. One man said, "Just needed an uplift." Another said he came "To put the world back into proper perspective." One said, "Spring is here!" Another, "To see God's work;" and another, simply, "We're in love."

One woman wrote on her card, "To relive old memories—I used to bring my daughter, now I bring my granddaughter," a sentence more full of meaning than we can understand, speaking, as it does, of years passing, a child discovering perhaps roses, a mother's delight in that discovery, and another child, a new generation to discover roses and much more.

Prairie—A Missouri Heritage

Four families of plants dominate the prairie: grasses, composites, legumes, and sedges. May's heavy rainfall should guarantee a lush growth of Big Bluestem Grass rising nine feet high and a dense stand of Indian Grass reaching six feet. The grasses produce a surprising range of colors. Some forms of Indian Grass are an exciting glaucous blue; selected and mass produced for gardeners they would make attractive background plants. In August, Indian Grass will produce numerous deep yellow flowers. The nodes of Big Bluestem are bluish but this grass saves its best display for a frosty day, when it assumes a deep color of fine wine. Other grasses turn autumn hues of tan, bronze and brown and dangle heavy heads of seed, a rich harvest for birds, mice, ants and others.

Often standing shoulder to shoulder with the grasses are the showy and diverse composites. Many of them, like the Sunflowers, have yellow blooms; their leaves may be long and narrow like Maximillian Sunflower, or heart-shaped like Ashy Sunflower. Other yellow giants of the prairie are Compass Plant, with its basal-branched leaves oriented north and south, and Cup Rosinweed, with its opposite leaves grasping each other across the stem. The yellows are repeated by Goldenrods, Coneflowers, Heliopsis and Black-eyed Susan, in different flower forms and sizes. Asters produce daisy-like flowers in white, pink, lavender and purple, and may remain attractive as summer wanes and frost collects in the low spots. Several species of Gayfeather produce tall spikes of pink among the yellow and Ironweed dominates with a tall purple, flat-headed cluster.

Most members of the pea family—the legumes—completed their flowering earlier, but they produce various types of seed pods. Wild Senna has long skinny pods; Wild Indigo has short bloated ones. Illinois Bundleflower produces contorted clusters of pods, while Beggar's Ticks fragment forming clinging hitchhikers and Sensitive Briar develops pods armed with recurred spines.

The sedges grow green, forming colonies that reproduce and die back each year, sacrificing this year's growth with all the other plants to produce a winter mulch and future compost.

The prairies of the Midwest are a bountiful environment; rich in soil, rich in plant diversity, rich in color, rich in insect life, rich in its usefullness for agriculture, and rich in history. Visit the Experimental Prairie at Shaw Arboretum any day this summer or fall and walk the windswept, buzzing grassland. Hike the newest trail at the Arboretum and absorb some of the richness of our natural and cultural heritage, or join a guided walk Thursday and Friday August 27 and 28 at 7:30 p.m. until sunset. Fee is $2.00 and reservations are required (577-5138).

—George Wise
Superintendent of Shaw Arboretum

Dr. Raven Receives AIBS Award

American Institute of Biological Sciences announced in June that Garden Director Dr. Peter H. Raven was the recipient of its 1981 Distinguished Service Award. The Award, instituted in 1972, is given annually to persons who have made an outstanding contribution to the advancement and integration of biological disciplines, the application of biological knowledge to the solution of mankind's problems, and the improvement of public policy and planning by the introduction of pertinent biological consideration.

A.I.B.S. is a scientific association with 7,500 individual members and 40 member professional scientific societies representing approximately 80,000 biologists. Founded in 1974, its purpose is the advancement of biological, medical and agricultural sciences and their applications to human welfare, and to foster, encourage and conduct research in the biological sciences.

Previous recipients of the Distinguished Service Award include Arthur D. Hassler, A. Starker Leopold, Ruth Patrick, Lee M. Talbot and Theodore C. Byerly.

The award will be presented at the Annual A.I.B.S. meeting in August.

Excerpt from A.I.B.S. Citation

"In your role as Director [of the Garden] you have not only provided the leadership which has established the Missouri Botanical Garden as one of the most active and progressive institutions of its kind, but you have also become a leading proponent on the urgent need for sampling, documenting and preserving for present and future generations, the diversity of living organisms—in an age when the world's natural heritage is rapidly being reduced in scope and diversity. Of special significance are your recent activities as Chairman of the National Research Council's Committee on Research Priorities in Tropical Biology. In this capacity, you not only guided the effort to compile the basic data and develop the published report, but you have also been an eloquent spokesperson decrying the despoliation of our tropical forests many of which will not exist in their present form by the end of this century."

Skylight Installed In Museum Building

A skylight was installed as part of the restoration of the Museum Building at Missouri Botanical Garden. The Museum was constructed in 1859 by Henry Shaw, the Garden's founder, to house his library and natural history specimens. It was designed by George I. Barnett, one of the foremost Victorian architects, after the plans for a similar building at Kew Gardens in England. The original skylight was removed approximately fifty years ago.

The ceiling mural around the skylight was commissioned by Shaw and painted by Leon Pomarede, and represents the flora and fauna of the world during the nineteenth century.

The Museum Building currently houses a restaurant, The Greenery.

Cactus This Summer

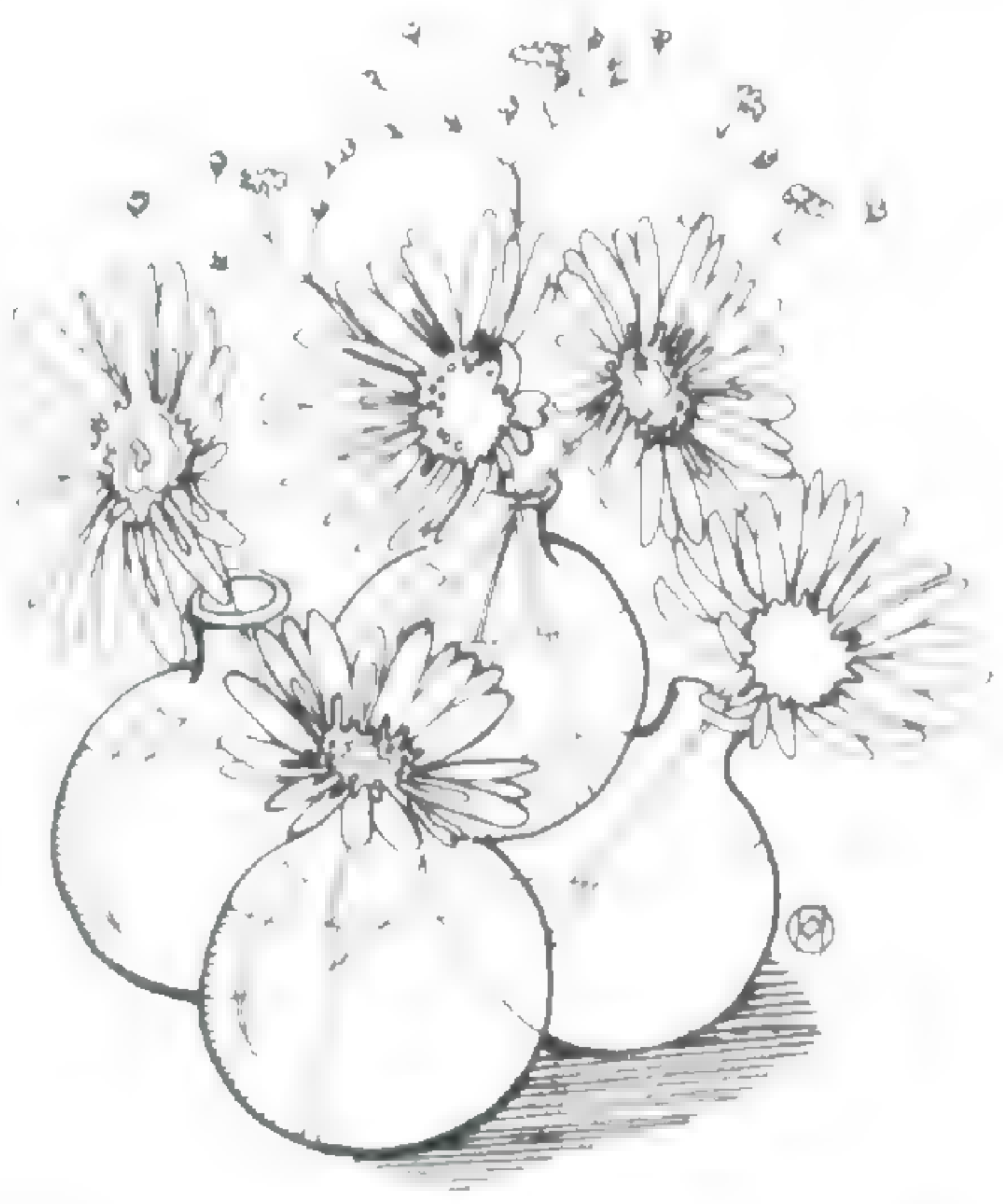
During August, there will be two exhibits of cactus. From August 15 through September 6, a Monster Cacti Display will be featured in the Desert House. The exhibit includes crested, monstrose, grafted and other interesting cactus mutations. The hours are 9 a.m. to 5 p.m.

The annual Henry Shaw Cactus Society Show comes to the John S. Lehmann Building on August 29 and continues through September 7. The hours of the Cactus Society Show are also 9 a.m. to 5 p.m.

New Coordinator of Funding

Pat Rich was named Coordinator of Funding in April. She was previously Project Director for the Capital Fund Drive Study of the Metropolitan Association of Philanthropy and is a past-President of the League of Women Voters of Metropolitan St. Louis. In 1977, she participated in the Danforth Foundation Leadership Program.

As Coordinator of Funding, she will investigate sources of foundation support for the Garden's tropical research and other technical areas.



*The Garden Gate Shop recently added another item to its collection of unique vases. Called **Little Danish Vases,** it is a cluster of four vases made from hand-formed glass. The four globes are artistically grouped by hand to provide an easy way to create exotic and attractive floral arrangements. A mirror base is included. (Price, $6.50. Members, $5.85)*

Mrs. Forest Claggett of Union, Missouri, donated over 150 Sedums and Sempervivums to the Garden recently. They have been planted in the outdoor hardy garden outside the Desert House.

The gazebo at the south end of the Anne L. Lehmann Rose Garden was featured as the cover of the 1981 St. Louis Visitors Guide, published by the Convention and Visitors Bureau of Greater St. Louis.

Students Provide Haiku for Exhibit

The haiku displayed in the Climatron for the Haiku Exhibit, which continues through July 14, was written by St. Louis area high school students who participated in a new program at the Garden this year.

The Partnership Program of the St. Louis Public Schools was initiated in 1979 to provide students with programs and special workshops at area businesses and cultural institutions. The Garden joined the Partnership Program with the beginning of the 1980-81 school year. Ilene Follman and Mimi Jackson are the coordinators of the program at the Garden, which offers students programs in many areas, including "Plants of Africa," "Carnivorous Plants: Springboard to Science Fiction Writing," and "The Plant World: Inspiration for Creative Writing," the course in which the haiku was written. Many of these courses will be repeated in subsequent years.

Lovely bird in lake
trees like wings blowing in wind
many years to come.
—Jim Blake
grade 12
Soldan High School

Garden by the pond
as waterfall flows quickly—
with a silent noise.
—Mike Andrews
grade 11
Soldan High School

Through dripping branches
the woods and I are as one
in the eyes of rain.
—Veronica Bohlen
Central High School

Education Department Receives Grant

The St. Louis Community Foundation has awarded a $6,100 grant to the Education Department to design and conduct a symposium for high school science teachers. The symposium is tentatively scheduled for spring, 1982, and will provide Metropolitan-area high school science teachers with information on current research in the biological sciences as well as with skills to transmit such information to students.

Calendar

July

The golden sun of midsummer is shining in the skies.—Mary Howitt

July 1-4	**Haiku Exhibit:** Climatron. Continues through July 14. 9 a.m.-5 p.m.
	Family Picnic Day: Garden Grounds, July 4, 9 a.m.-6 p.m. A pleasant Independence Day.
July 5-11	**Haiku Exhibit:** Continues
July 12-18	**Haiku Exhibit:** Continues (Last Day, July 14)
July 19-25	**Henry Shaw's Birthday:** Garden Grounds, July 24, 1 p.m.-4 p.m. Celebrate the 181st birthday of the Garden's founder.

August

The summer evening ripened and fell open
And people walking . . .
Were suddenly what they were meant to be.—Winifred Welles

August 1-15	**Monster Cacti Exhibit:** Desert House, opens on August 15, 9 a.m.-5 p.m. (through September 6)
August 16-22	**Monster Cacti Exhibit:** Continues
August 23-31	**Henry Shaw Cactus Society Show:** John S. Lehmann Building, Opens August 29, 9 a.m.-5 p.m. (through September 7)
	Operation Clean Stream: Arboretum, August 29, 9:30 a.m.-approximately 4:30 p.m.
	Monster Cacti Exhibit: Continues

COMING

September 1-December 31	**Lines and Curves; Paper and Ink: A Festival of the Book Arts:** Library and John S. Lehmann Building

TRIBUTES

June/July 1981

IN HONOR OF:

Another Lovely Summer
Mr./Mrs. Harry Milton

Mr. Howard F. Baer
Caroly and John Isaacs, Jr.

Ivan T. Bauman
Carroll and Wyona

Mrs. Robert B. Forbes
Four Seasons Garden Club

Geraldine Friedman and Packy McFarland
Mel and Gloria Cotlar

Irv Gordon
Walter and Beverlee

Mr./Mrs. Homer Korn
Friends in Rock Hill Garden Club #1

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Marilyn and Art Boettcher, Jr.

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Jeanne and Lester Adelson

Kenneth Peck, the Education Department and the Library
Lucy Levy

Carroll Stribling
Richard and Charline Baizer

Mrs. Irving Talcoff
Margie, Bert, Susie and Gail

Mr. J. Tohtz
Castlereagh Garden Club
Ferguson Garden Club

Mr./Mrs. Bob Weiss
Harold and June Kravin

Mr./Mrs. Herman Willer
Mr./Mrs. Myron Glassberg

Mr. Jay Zimmerman
Sunny and Myron Glassberg

IN MEMORY OF:

A Beautiful Spring Day
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Mr./Mrs. W. King Ambler

Phoebe Anderson
Mr./Mrs. H. L. Carson
William and Elizabeth B. Schroer

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Lisette E. Schaumburg

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Anonymous

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Chester Cadle
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Virginia Fisher
Missouri Botanical Garden Guides

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Sam Kaufer
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Mr./Mrs. T. T. Okamoto

Marjorie Maechling
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Lisette Schaumburg

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Pat Brock

Mrs. Eugenia U. Maritz
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Mr./Mrs. Monte C. Throdahl

Rynolds Medart
Julia Lamy Anstey

Mrs. Madge Moline
Gwen Springett

Julie Moody
Dr./Mrs. D. R. Herbold

Mrs. Viktor Muehlenbachs
Florence S. Guth

Mr. Harold Norman
Mr./Mrs. Arthur L. Rettig

Mabel Patterson
Mr./Mrs. J. Harold Matthew

Michael C. Paul
Mr./Mrs. Dan Schopp

William Parker
Dr./Mrs. G. S. Kieffer

Agnes Quest
Amy and Ruth Entwistle
Carol Entwistle
Mr./Mrs. James Entwistle, Jr.
Jeanne Entwistle
Paul Entwistle
Rosalie Hays
Mr./Mrs. Christopher Scholbe

Precious Rives
Byron B. Gross, D.D.S.

Louis L. Roth
Elizabeth and Alexander Bakewell
Mrs. John W. Calhoun

Mr. J. Glennon Schreiber
Jessie and Mary Lansing

Isabelle R. Schwerdtmann
Joan Y. Henry
Mr./Mrs. Patrick R. Walsh

Sister Rose
Mrs. Louis W. Rubin

Mr. Guy Snyder
Mr./Mrs. Robert B. Smith

Mr./Mrs. Charles C. Spink
Edith and Johnson Spink

Mr./Mrs. J. G. Taylor Spink
Edith and Johnson Spink

John Tarr
Art and Velma Faltus

Henry Teldon
Bert and Margie Talcoff

Dennis Thaman
Mr./Mrs. Howard Dissly

Lorene Mueller Tribout
Mr./Mrs. W. R. Kleypas

Mr. Milton H. Tucker
Eleanor and Henry Hitchcock
Tamra and Peter Raven
Mr./Mrs. Robert H. Shoenberg

Mrs. Stanley Wald
Majel Obata

George Weiss
Helen K. Hartwig

Dr. W. G. Woebling
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"No one who visits Saint Louis should fail to see Shaw's Garden ... Ten acres are devoted to flowers and shrubbery of every known variety, a number of greenhouses sheltering tropical plants and other exotics ... and there are a museum and a botanical library in connection with the Garden. During the week the grounds are open to the public, but on Sunday only strangers are admitted, who must procure tickets for the privilege." —from Down the Great River, *Captain Willard Glazier, 1887, page 326. (Photograph printed from a magic lantern slide from Missouri Botanical Garden archives.)*

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Working Through the Eleventh Hour

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Everyone who reads the popular oress nowadays is aware of the extraordinary biological richness of the world's ropical rain forests and of the present ast pace at which they are being cut down. Less generally recognized is how ittle we know about the many species of tropical plants and animals and how he current destruction of the rain orests makes the need to increase our nowledge a pressing one. Of the estimated 3 million species of plants and nimals in the tropics, only about 00,000 have been recognized and ataloged. In comparison, the emperate regions of the world contain ome 1.5 million species, of which nore than a million have been cataoged. A large majority of virtually every nown group of organisms occurs in the tropics, making ropical forests the richest and most diverse association of lants and animals anywhere on the earth. About as many inds of plants exist in the tiny country of Panama, for examle, as in the entire continent of Europe, and nearly as many inds of fishes—some 5,000—live in the drainage basin of he Amazon River as in the whole Atlantic Ocean. The diverse inds of plants and animals in the tropics represent a potenally inexhaustible source of raw materials, only a minute action of which has been utilized or even tested up to this oint.

Every week the remaining tropical lowland forest diminishes by an area about the size of Delaware.

Three men are studying a one-foot by one-and-one-half-oot sheet of stiff paper. Affixed to the paper is a dried plant, s brown leaves pocked by insect holes. Holding a handful of oose, dry leaves beside the mounted plant specimen, they ompare the two. One of the men says that the loose pecimen matches the mounted one; after another minute of tudy, the other two concur. One of the men, speaking in a ronounced German accent, says that he had collected the oose specimen ten years before on the eastern slopes of the olivian Andes and had carried it with him since then trying to identify it.

The German is Stephan Beck, an ecologist who has been working for the last two and one-half years in Bolivia, helping the Bolivians to improve their Department of Biology at the Instituto de Ecología, teaching the people of that nation, and studying the most important ecosystems of the country. Through the Herbario Nacional de Bolivia, he has been working, through correspondence, with the herbarium at Missouri Botanical Garden. "We have been trying to get plants identified," Beck says. "We can't study the ecology of an area without doing very basic research, without knowing the flora. Bolivia is one of the least collected areas of South America. Before the Instituto de Ecología was established recently, there were few trained biologists in Bolivia; few specimens; little literature. Now—the next fifteen to twenty years—is the only time we will have to study some regions of Bolivia in an undisturbed conditions. And not only Bolivia; virtually all the vegetation types of Latin America are under pressure."

Against this background, the tiny effort that is being undertaken to learn more about tropical plants and animals and the natural communities in which they live is embarrassing. Worldwide, there are no more than an estimated 4,000 scientists primarily concerned with studies of this kind; the total in the United States amounts to some 1,500 individuals. Probably no more that 1,500 scientists in the world are able to catalog and describe tropical organisms or are even competent to make professional identification of them. The number of unknown tropical organisms—five out of six have never been seen by any scientist—amounts to a staggering total of some 2.5 million species, or about twice as many as all species described during the 225 years since our current system of naming organisms was begun by Linnaeus.

An even smaller number of scientists throughout the world—no more than two dozen—are competent to supervise and undertake large-scale studies and experimental modification of tropical ecological systems. Of the handful of these individuals in the United States, no more than three are

(continued on page 3)

Update

Governor Signs Tax District Bill

On August 4, Governor Christopher Bond signed the bill calling for the establishment of the botanical garden subdistrict of the Zoo-Museum Tax District. The measure will appear on the ballot in St. Louis City and St. Louis County for voter approval in 1982. If a majority of voters in both the city and county approve the measure, the Garden would be able to receive tax support of up to 4¢ per $100 of property valuation.

Pictured (l-r): Frank P. Wolff, Jr. (attorney for the Garden), State Senator John E. Scott (one of the tax bill's sponsors), Governor Christopher S. Bond, Dr. Peter H. Raven. C. C. Johnson Spink, and Richard A. Daley. Not pictured is Representative Russel E. Egan, who is the Speaker of the Missouri House and a sponsor of the legislation.

Dr. Raven's 10th Anniversary

Peter H. Raven became Director of the Garden on August 1, 1971. Since then, the Japanese Garden was constructed, as were the Anne L. Lehmann Rose Garden, the English Woodland Garden and the Shapleigh and Shoenberg fountains; the John S. Lehmann Building was completed and the Linnean House restored; construction of the Visitor Center was begun; and the size of the research program tripled to make it the most active tropical botany program in the world.

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Working Through the Eleventh Hour-Continued

engaged in tropical studies at present.

The extremely serious nature of these deficiencies can be understood properly only when viewed against the background of tropical deforestation. The lowland tropical forests, which a century ago made up an area twice the size of Europe, have been reduced to about half their former extent. Every week, the remaining tropical lowland forest diminishes by an area about the size of Delaware, and every year, an area about the size of the island of Great Britain is removed.

The Guest Book that lies open on a shelf fifteen feet from the entrance to the herbarium contains page after page of visiting scientists' names and their countries of origin; Nicaragua, Argentina, Germany, Nigeria, Peoples' Republic of China, Israel, Japan. Names of the Chinese scientists are entered in the book in Chinese characters. Their arrivals and departures, the nature of their work, the lectures and seminars they present for the scientific staff and other interested persons here, are noted on the bulletin boards and in an informal, photocopied newsletter that is distributed weekly. The newsletter, called *MO*, was first published in January of this year because of the intensity of work and the large number and frequency of visitors to the herbarium at the Garden.

The cutover area often becomes a wasteland, with restoration to any productive use virtually impossible.

As a member of the botanical community, the Garden each year sponsors an international systematics symposium —this year will see the twenty-eighth annual symposium—at which scientists meet, present papers, and discuss current botanical problems. The symposium this year, scheduled for October 16-17, will focus on "Biological Studies in Central America" and speakers will include botanists from Costa Rica, Great Britain, Mexico, California, Arizona as well as one from the Garden's staff—Dr. Alwyn H. Gentry.

There are other signs of the high level of activity in the herbarium: piles of folders of plant specimens being lent to herbaria throughout the world; specimens having been borrowed; specimens, received from botanists collecting in the field, in various stages of cataloging—identifying, mounting, being sorted; correspondence; articles for scientific journals; scientific journals received. In numbers: In 1980, 70,018 specimens mounted and added to the herbarium bringing the otal of numbered specimens to 2,809,019 and the complete otal of specimens to over three million; 29,496 specimens oaned to other herbaria, with over 150 publications in twenty-one significant journals resulting from work with the herbarium specimens. Scientists and government leaders on every continent, most who have never seen the Climatron or Japanese Garden, know the work of the herbarium here; MO, as it is known, that being its internationally recognized acronym.

The organisms that make up the ecological communities of the tropics are linked together in extremely complex ways. Fundamental processes such energy flow and mineral cyclng, which are complex and poorly understood even in emperate regions, are virtually unknown for the tropics. We do know that the rich and diverse communities of plants and animals that occupy tropical soils are relatively stable when undisturbed. They have remained stable for millions of years and are as appropriate to the climate and soils of their areas as the forests, swamps, and prairies in the United States are to theirs. When farmers plow up a prairie in the Midwest to plant crops, they are modifying a natural ecological system in order to create another productive, sustainable system. When agriculturists cut down a forest in the humid lowland tropics, they are often trying to accomplish the same thing. The many differences between the ecological processes involved in the two instances, however, have potentially tragic consequences for a large and rapidly growing portion of the human race. Once the sorts of forests that occupy most tropical areas are cut down, a reasonable agricultural yield is usually possible for only a few years. The cutover area, depleted of its fertility, often becomes a wasteland, with restoration to its original state or to use for any productive purpose virtually impossible.

Our ignorance about ecological processes in the tropics is compounded by our general lack of knowledge about tropical organisms. To give just a few examples, some ten to fifteen thousand kinds of plants in Latin America, including many trees, have not yet been scientifically described and listed. These plants, which constitute perhaps an eighth of the total plants in Latin America, are generally viewed as a valuable resource, but as long as they remain unknown, they cannot be utilized rationally for human benefit. Similarly, many people are counting on manipulating the populations of fishes in the Amazon Basin and its tributaries as a way of increasing food production in the future. Competent students estimate, however, that approximately 40 percent of these fishes have not yet been recognized and cataloged. In other words, hopes are pinned on manipulating a system in which only somewhat over half of the elements have been registered, much less understood. Imagine trying to build a computer or an airplane from such a starting point!

The principal area of scientific concentration at Missouri Botanical Garden is the study of the flora of the tropical and sub-tropical regions of the globe, especially Latin America; its program is, in fact, the largest and most active in tropical botany in the world. The herbarium, the fourth largest in the country and one of the world's ten largest, is the North American repository for African specimens, which means that scientists collecting in Africa know that they can deposit their specimens at the Herbarium for the greatest amount of subsequent exposure and use. The Garden also has a very active program in New Caledonia. However, the scientific work was not always concentrated on the tropics.

When Henry Shaw founded the Garden in the middle of the last century, his principal interest was in the creation of an attractive garden for visitors. It was George Engelmann who suggested to Shaw that a complete botanical garden should have a scientific program and Shaw commissioned Engelmann to acquire books and specimens for the establishment of a research program. In 1857, Engelmann

(continued)

purchased the herbarium of the late Dr. Johann Jakob Bernhardi for $600. Bernhardi (1774-1850) was a German physician and director of the botanical garden in Erfurt in that country. Then it was common for individuals to accumulate private herbaria and Bernhardi was no exception.

This collection contained over 62,000 specimens of an approximate world-wide representation of species. At the time there was little else in the United States to match it. For the next three decades no specimens were added to Shaw's herbarium until the death of Engelmann, who willed his private herbarium of about 100,000 specimens to the Garden in 1884. When William Trelease succeeded Shaw as Garden Director, he began to increase the scientific program using the Bernhardi and Engelmann herbaria; it was during Trelease's directorship that the first Garden botanists made collecting trips to other continents. But these early collections and the two herbaria that were the basis of the Garden's herbarium were broad, not concentrated in any specific area.

The Garden's botanical interest in the tropics can be actually traced to its horticultural interest in orchids. During the first quarter of this century, several individuals made gifts of orchid collections to the Garden. In the January, 1916, *Bulletin* it is reported that, "Mr. D. S. Brown of Kirkwood, Missouri, whose collection of orchids is known throughout the world, has recently presented to the Garden some of his choicest plants, and these, added to the orchids already at the Garden constitute one of the largest and most representative collections...in the country." His gift included about 350 plants, 200 of them are rare hybrids. In 1918, he made an even larger gift to the Garden and by 1919, the Garden's orchid collection was said to "excell all in the United States," this from the January, 1920, *Bulletin.* In 1923, George Pring, Horticulturist, visited Central and South America to collect orchids for the Garden's display; because of the war, it had become difficult to acquire orchids in the United States and it was necessary to go to the native home of the plants. Pring's trip received much national attention. Three years later C. W. Powell of the Canal Zone donated his orchid collection to the Garden also. Much of that collection remained in Balboa, Canal Zone, for the purposes of experimentation. The Canal Zone government set aside a tract of land for an orchid garden and the Garden established there a Tropical Research Station. During the 1930s, because of the presence of the Tropical Station, Garden staff botanists made several botanical expeditions there. By the end of that decade, several "Contributions toward a Flora of Panama" were published in the Garden's scientific journal, the *Annals.* In 1943, Robert E. Woodson, Jr., Herbarium Curator, formally initiated the Flora of Panama project, with publications in the *Annals.* From the early 1950s until the mid-1960s, the Garden's scientific work became progressively less and less until at Woodson's death in 1963 it was all but inactive. With the arrival of Woodson's successor, Walter H. Lewis, the botanical work was revived. Dr. Marshall Crosby, currently the Garden's Director of Research, explained Lewis's reason for concentrating on the tropics "It only made sense to build on what was there. The Flora of Panama program was there and Lewis reactivated it."

Current conservation efforts tend to concentrate on a few well-known plants and animals, while thousands of other species go extinct without fanfare.

When they learn that tropical forests are rapidly disappearing, many people accept the destruction as warranted since they believe it will lead to the implementation of productive forms of agriculture that will help feed the hungry people of the world—much as the clearing of the forests in Europe and North America made possible the widespread of productive agricultural systems in these regions over the centuries. Unfortunately, the comparison is totally without basis in fact. The current estimate of many Brazilian officials, for example, is that with currently available technology only approximately 0.3 percent of the vast lowland forests in the Amazon Basin can be put into sustainable agriculture; about 95 percent of all the land in Brazil that is capable of sustained agricultural productivity is already under cultivation. The country now has some 90 million people of which about a third are malnourished. Since the population is expected to double during the next twenty-three years, how malnutrition could be held even at the same proportionate level as it is today is unclear. Indeed, if the plans of the Brazilian government to alleviate the nation's acute energy shortage by planting sugar cane for the production of alcohol are implemented, approximately one-sixth of the currently productive agricultural land of Brazil could be taken out of production, a sacrifice that surely cannot be sustained in a country where a very large number of people are malnourished.

Poor people, denied access to arable land, cause about two-thirds of all destruction and alteration of tropical forests. These forest farmers cut out a section of forest and grow a crop or two before the soil deteriorates to the point where cultivation is no longer feasible. A variety of other factors are responsible for the remaining destruction of tropical forests. In Southeast Asia, the wholesale exploitation of forests fo timber by foreign-owned corporations, which make little more than a gesture toward the replacement of the forests, is the major factor. In Latin America, the relentless effort to produce cheap beef for the United States and other developed countries is causing the disappearance of vast areas of forest.

Regardless of whether they are developed wisely or unwisely, tropical forests are being cut down, and if thei destruction and conversion is indeed irreversible, approximately one million kinds of plants and animals, or one quarter of all that exist, will become extinct during the nex thirty years, and possibly another million during the course o the twenty-first century.

The loss of biological diversity in the tropics as a result o these extinctions will have serious consequences for the human race. Every species is genetically unique. We canno study an extinct species, we cannot use it, and we canno develop it into something more useful.

Tourists do not go where they go, over unpaved trails; up mountains that the casual hiker would never attempt; through the thick brush. When they return to St. Louis, there are the stories about the campertruck that wouldn't run and that required days to repair, leaving them confined to only a small area in which to collect; days out of touch with no news of crimes, legislative hassles, sports' scores.

"Of course, often you can sleep late," Nancy Morin says. Dr. Morin is the present Curator of the Herbarium. "You wake up and collect where you are. But it's more than just walking along a trail and picking flowers. The family I am interested in, Campanulaceae (the Blue Bell family), grows low to the ground. I spend a lot of time walking while bent over; sometimes I walk a long way without seeing a single one. You collect until almost dark then go back to camp, load up your jeep, and drive for several hours to the next good campsite, then stop for the night—maybe one or two in the morning—unroll your sleeping bag and collapse, and wake up the next day to start over."

As-yet-unknown plants might well contain chemicals that would assist in the cure for cancer.

"All herbarium paper is about one foot by one and one-half feet, plus or minus a few centimeters." Marshall Crosby guides me through the herbarium explaining what occurs there. There and thousands of miles away, where the botanists work in the field. "A botanist cuts a branch from a tree or digs up a plant, keeping in mind that the specimen must fit onto a herbarium sheet. He inserts the plant into a folded sheet of newspaper—newspaper is used because it is readily available everywhere, and a standard folded sheet is about the size of herbarium paper. He marks a number onto the newspaper and puts it into a field press." Crosby shows such a press, two separate pieces of plywood, slightly larger than the folded newpapers and held together by two leather straps. "The botanist records in a notebook the number he gave the specimen—each botanist numbers his collections throughout his career, beginning with number one. He also records where the specimen was collected, the conditions of the area—hot, dry; cool, moist—when it was collected. Often he'll record the flower color, if the specimen is in bloom, because flowers tend to fade when they are dried. When he returns to his camp, he dries his collection in a drying press—it's similar to a field press, except it's made of inch-wide wooden slats, the slats crossing one another horizontally and vertically. Sheets of corrugated cardboard are placed between the sheets of newspaper to speed drying. He sets the press over a heat source, a small stove maybe, to dry and ships the collection back to us when it's thoroughly dried."

The herbarium workroom, located upstairs from the herbarium, has boxes on tables and on the floor; files of specimens stacked two feet high. Here all specimens from he field are received, and the postal stamps on the cartons hat fill the room would keep a collector busy for a long while, such is the diversity and number of their places of issue. From he workroom the specimens are sent to be fumigated; they are treated with Dawson-37 to rid them of insects; even a small number of rapidly reproducing insects admitted into the herbarium could be catastrophic to the collection.

After they are fumigated, they are sent to the mounting department. There, nine mounters glue the specimens onto herbarium sheets and weight them by laying small flat recangles of lead wrapped in teflon-coated, self-adhesive shelf paper until the glue dries and the plant is permanently affixed to the paper. Herbarium sheets are 100% cotton paper which, unlike wood pulp paper, can last indefinitely. Herbarium specimens are meant to be preserved for centuries, and in fact there are many speciments in the herbarium that are well over two centuries old that show no signs of deterioration.

After mounting, the specimens are filed, being stored in large compactors, arranged throughout the herbarium according to botanical family and within the families genera are divided alphabetically; species are divided by geographical location—for cataloging purposes, the globe is divided into nine areas—and then arranged alphabetically under location.

Current conservation efforts, unfortunately, still tend to concentrate on a few obvious or well-known plants and animals, such as the Furbish lousewort, the snail darter, the elephant, or the tiger, while tens of thousands of other species go extinct without fanfare. Probably twenty times as much is spent annually to try to preserve the roughly thirty surviving California condors as is spent to find new kinds of tropical plants that might be important sources of food, fuel, or medicine. We must ask ourselves which kind of action has the greatest potential for alleviating human misery and helping to create a stable world.

What happens in the tropics affects the entire world. For example, the shortages of many kinds of commodities, which developed countries formerly obtained from the tropics at very low prices, are already contributing to worldwide inflation and hence instability, and they will do so to a greater extent in the future. As a matter of self-interest and national security, all temperate, developed countries ought to begin to contribute substantially to the development of sustainable productive agricultural and forestry systems in the tropics.

Conversation with Dr. Marshall Crosby, Director of Research

Marshall Crosby "If you look back over ten years ago, and compare the number of dollars going into tropical botany, you see that it is more now than in 1970. Too, if you look at the staff here ten years ago, you see that there were four permanent staff members with Ph.D.s here, while currently there are thirteen."

Bulletin "Why is there this increased activity in tropical botany?"

MC "The tropics are interesting—they're extremely rich botanically. About one-third of all the world's plant species—about 80,000 species—occur in the American tropics—between Mexico and Chile. Or to give a more specific example, there are about 1,900 species in Missouri, while on Barro Colorado Island in the Panama Canal there are about 1,300. That island is six square miles; Forest Park, by comparison, is a little over one-third that size. But more important than their being interesting, the tropics are barely known and they're threatened."

B If I may play the devil's advocate for a minute, why study plants at all?

MC For several reasons. By studying plants, you can understand the evolutionary process; you can understand natural interrelationships.

B But is all the cataloging necessary?

MC Well, let me use a metaphor here. If you like a book by

(continued)

The Eleventh Hour

Faulkner and you want to read more Faulkner, and your books are unorganized, it would be difficult to find another Faulkner. But if they're arranged in some system, say alphabetically, you can go to the section for Faulkner and find what you want. Now, if you are farming and you have a crop that you like and want to plant one similar, it is easy to find one if plants are organized in some fashion. Likewise, if you have a crop and it is going nicely over several years until one day it is diseased and you need to find a disease-resistant strain, it is easier to locate one if you can go to a herbarium and find other strains and where they occur in the world. The same is true if you are growing a crop and want to raise a more productive strain. Having a systematically organized area that you can go to to find similar plants, to find where these plants grow is easier than traveling around the world looking at all the plants.

B But not all plants that you study and catalog have practical uses, like the crops you mentioned.

MC True. However, we can't know which plants are useful until we study them. And another thing, it's important to study all plants, not only the so-called useful ones. For example, mosses are good for nothing; they have no practical uses—except one genus, *Sphagnum* (peat moss), which is used for horticultural purposes. People want mosses to have a use—I suppose they want everything to have a use. I've been studying mosses for a long time, and I can't tell them, 'Yes, they will have a use.' But it is as important to study them as to study other plants. If you decide that we're just going to study certain organisms because they're useful, and exclude the so-called unuseful plants, you can't understand the useful ones. You can't understand corn without studying its unuseful relatives. On another plane you can't understand the higher level plants without knowing the lower plants—mosses being one of these.

B Briefly, why is the scientific work at the Garden important?

MC First, because it's important for mankind to know about all organisms; to know—curiosity—is part of the human condition. Second, specifically regarding the tropics, we can't manage tropical forests without knowing how they work and we can't understand how they work without understanding their parts. Finally, man uses very few plants—probably less than 1,000 species; most of our food comes from about twenty different plants—but there must be more out there to be used because there are so many that have not been characterized. The beginning of finding out about these plants is finding out what they are.

Greater knowledge about the tropics is certain to result in many discoveries that will promote human welfare. Approximately 45 percent of the medical prescriptions currently written in the United States, for instance, contain at least one product of natural origin, and as-yet-unknown plants might well contain chemicals that would assist in the cure for cancer.

The countries of the world, developed and undeveloped, can prosper and exist in peace only in a relatively stable world. If we are to enjoy the benefits of global stability during the next century, indeed if we are to survive, we must seize the opportunities that are still available to us but which are diminishing every day.

The Garden's research program, its history and function, will be the topic of the Fall Lecture Series, beginning on Wednesday, October 14, with Dr. Nancy Morin, Herbarium Curator, presenting a talk on the beginning of the scientific work and the involvement of Henry Shaw and Dr. George Engelmann. On October 21, Dr. Marshall Crosby, Director of Research, will discuss William Trelease and the Garden's work in the early twentieth century. On October 28, Dr. William D'Arcy, Research Botanist and Editor of the Flora of Panama Project, will discuss the Flora of Panama and the Garden's introduction to the tropics. All lectures are held in the Auditorium of the John S. Lehmann Building and are presented at 10:30 a.m. and 8:00 p.m. Members and their guests are admitted free of charge.

Visitors...

Mr. Zac. O. Gbile, Nigeria

"We had thought that a species, *Solanum nigrum*, occurred in Nigeria. I came to the Garden to collaborate with Dr. [William] D'Arcy, who is a renowned specialist on Solanaceae, the family that *S. nigrum* is part of. We were able to determine that it was not, *sensu stricto* [in the strict sense], *S. nigrum* but a species that was a member of the *S. nigrum* complex."

It is more than splitting hairs to say that a particular plant is not one species but a member of that species-complex. "Precise identification is important for several reasons," D'Arcy said. "Species of the genus *Solanum* are important food crops in Mr. Gbile's country. When they begin to hybridize species, they must know exactly the species of plant they are working with. Also some plants closely related to *Solanum nigrum* are toxic."

Dr. Uzi Plitmann, Israel

"This institution should be an example to others because it combines research, public education, preservation and public recreation. This is what you expect from museums.

"I came here for two reasons. To talk with Peter [Raven] about a project we have been working on for ten years. Also to work in the herbarium, to look for a few species of phlox and vetches. I wanted to see seeds of some American indiginous species and compare them with Old World species, to get an idea of what the common species here are.

"My primary interest is in the evolution of cultivated plants and how they relate to their wild relatives, specifically biosystematic problems concerning legumes."

For the inhabitants of many countries, legumes—peas and beans—are the primary source of protein. "Legumes are the meat of the poor." Dr. Plitmann said.

Dr. Juan Hunziker, Argentina

"I have been in contact with the Garden since I was twenty years old; mostly through correspondence, sending specimens and receiving publications in exchange. This is the first time I have actually visited here. I came to work on Zygophyllaceae, the creosote bush family; at present I am studying the genus *Bulnesia*. It has a very peculiar pattern of distribution and I came partly to have the advice of Dr. Raven on the problem of this distribution."

Two species of *Bulnesia* are used in Argentina for the construction of fences and other structures that are inbedded into the soil. Because of its high resin content, it does not rot when it is in the ground, like many woods might.

Gardening In St. Louis

Autumn is Lawn Care Season If you fertilize your lawn one time a year, do it in the fall, applying a high nitrogen formulation (the first number of the fertilizer bag). Lawn fertilizers that contain ureaform (nitroform) are slow-releasing and are especially recommended if you only fertilize once a year.

Lawns may be reseeded now. Damp, cooler weather encourages good seed germination. Use high-quality seed; *do not buy cheap grass seed!* It contains many undesirable, wide-blade grass varieties. Use a cyclone-type spreader for even coverage.

Alan Godlewski, the Garden's Chairman of Landscape Horticulture, recommends the following grass varieties for St. Louis: *Bluegrass*—Merion, Touchdown, Baron and Nugget; *Perennial Rye*—Regal; *Tall Fescue*—Rebel or K-31. For a high-quality lawn you might try a blend of 80% of any of the above Bluegrass varieties with 20% of Perennial Rye Regal. For a play or picnic area you might try a blend of 80% of one of the Tall Fescue varieties plus 20% of Bluegrass.

Build a Cold Frame This invaluable structure can be used in the fall for overwintering seedlings of biennials and perennials and for tender bonsai specimens. A cold frame can also be used for forcing spring flowering bulbs. If you put an electric heating cable in your frame you can use it as a miniature greenhouse to grow winter lettuce and spinach or cool greenhouse pot plants like primroses, pansies, calceolarias, cinerarias and cyclamen.

Make a Compost Pile No time of the year is richer for available organic matter than is fall. If you can shred the material with the lawn mower or a commercial shredder before you stack it in heaps, it will decompose more quickly. Add a handful of any high-nitrogen fertilizer (extra lawn fertilizer is fine) to each 1-foot layer of the compost pile.

Use a blend of organic material such as leaves, garden refuse (that does not contain insects or diseases) and grass clippings. Never stack grass clippings deeper than an inch or two or they will become a soggy and smelly mess. Compost materials can conveniently be stacked in cages made of wire fabric or, if you have little space, can be stored in sealed plastic gargage bags. Be sure the compost is slightly damp but not wet. If you do not want to go to the trouble to stack your compost pile, you can practice sheet composting. This consists of using the organic matter as a 2″ to 5″ mulch. It can be applied on the bare ground of your vegetable and flower garden and rototilled or spaded into the garden next spring.

Houseplants Do not wait too long to bring your houseplants inside from their summer vacation on the porch or patio. Usually the middle to late part of September is not too early. The plants should have a chance to become acclimated to their indoor home before they are faced with the dry air from the furnace. When the plants are brought in, check them closely for insects and diseases. If they have any of these pests, this is the time to treat them while they can still be sprayed outdoors. You might want to try a new product called Safer Agro-Chem's Insecticidal Soap. It is very safe to use and is supposed to be highly effective for mealybugs, mites, aphids and whiteflies.

Prepare Now for Early Winter Blooms Plant bulbs of paperwhites and Soleil d'or daffodils from mid to late October for early flowering indoors. Also try some Roman hyacinths or pre-cooled miniature hyacinths. Take cuttings of begonias and plant bulbs of caladiums, gloxinias (properly called sinningias) and amaryllis.

Check List

Now is a good time to:

- Clean up the garden. Insects and diseases overwinter in garden refuse.
- Watch for signs of powdery mildew. Spray with Karathane, Benlate or Actidione PM.
- Dig compact plants of herbs, such as parsley and chives for growing and pot plants for winter use.
- Plant spring bulbs in mid to late October so they have time to root well before the ground freezes.
- Keep the leaves raked off your lawn. Leaves can easily smother the grass.
- Order roses for fall planting.
- Divide and re-set perennials and biennials.

Steven A. Frowine, Chairman, Indoor Horticulture

Henry Shaw Birthday Card Contest Winners

In honor of Henry Shaw's 181st birthday the Garden and Bussmann Division, McGraw-Edison Company, co-sponsored a party and a birthday card contest. Three winners were selected; they each received $100 educational scholarships, courtesy of Bussmann. Pictured at right are James N. Mills, President of Bussmann; Susan Romano (9); one of the scholarship winners; C. C. Johnson Spink, President of the Garden's Board of Trustees; and Jennifer Goedeker (6), another scholarship winner. The third winner, Michele Douglas (11), was not available for the photograph. Despite a day of heavy rain, over 1,000 attended the celebration, which included music, clowns, magic, mimes and juggling.

Wasps, Pines, and the Daily News

This *Bulletin*, newspapers, books, calendars, towels, tissues, money, photographs, boxes, stationary, cups, plates, sugar packets; paper that we write on, read, spend, cover walls with. We are so surrounded by it that we probably accept it as one of the base elements, like chemicals; like fire, earth, water and air; a fifth essence. In truth, of course, it is manufacturer—over 63,900,000 tons produced in the United States last year, according to the American Paper Institute—whether in large commercial mills in Canton, North Carolina, or in a kitchen blender in Webster Groves, Missouri; trees are cut, chopped, pulped and processed.

The manufacture of the first sheet of paper is credited to a Chinese nobleman, Ts'ai Lun, who in 105 A.D. produced a thin, felted material from macerated vegetable fiber. Until the mid-eighth century, the craft was confined to the Orient, with the primary raw material being mulberry bark. In 751, the Samarkand army captured a number of skilled Chinese papermakers in a battle and the art was brought to the Arab world. Because there was a scarcity of mulberrys in Samarkand, the papermakers began using other materials, primarily linen and cotton. The first papermaking in Europe occurred in about the twelfth century and, because it came to that continent from the Middle East, the Europeans used cotton and linen as the Arabs had; until the end of the eighteenth century, most European paper was made from these materials. In the middle of that century, because printing technology had advanced to a stage at which books and other materials were available and demanded on a large scale, the consumption of paper reached the level at which it became difficult to acquire sufficient cotton and linen rags. By the last third of the century, legislatures were urging citizens to save every scrap of cloth; newspapers were advertising for its subscribers to sell their rags to mills. The *North Carolina Gazette* suggested to its women readers that if they sent "to the paper mill an old handkerchief ...there is a possibility of it returning to them as a *billet doux* from their lovers."

As early as 1719, however, Réne Antoine de Réaumur, a French naturalist, foresaw that the use of paper was increasing so rapidly that the common materials were not available in the necessary quantity to support that increase. In a treatise written that year he noted, "The American wasps form a very fine paper...they extract the fibres of common wood...and teach us that paper can be made from the fibres of plants without the use of linen or rags." Since that time, it has been common to acknowledge the wasp as the first papermaker. Réaumur observed that the wasp chewed dry wood, mixing it with saliva to size it, and used the material to make its nests; this process is analogous to groundwood pulping, a mechanical process used in the manufacture of inexpensive papers, such as the newsprint on which newspapers are published.

It was a man who was one year old when Réaumur published his paper on wasps and papermaking who made the greatest contributions to the use of materials other than rags in European paper. Jacob Christian Schaffer (1718-90), a Bavarian clergyman with an interest in botany, principally the flora of his country, performed experiments in which he produced paper from numerous materials; the six volume work he published in 1765 on his experiments contained, as an appendix, 95 paper specimens, each from a different material. Those samples included paper from poplar down, tree moss, grapevine bark, hemp, aloe, stinging nettle, cabbage stalks, potato skins and bulrushes. It is interesting that one of his earliest samples was produced from wasps' nests.

About thirty-five years later an Englishman, Matthias Koops, became the first to manufacture paper from various vegetable fibers on a large commercial scale. His venture was bankrupt within three years; however, he was granted three patents in 1800-01 for his process. The majority of today's commercial paper manufacturing is based on Koops's work.

Almost all of the paper manufactured now is from plant pulp, with ninety percent coming from trees. The cotton and linen fibers that were the primary source of paper in the first six centuries of European papermaking are used mainly in fine writing papers, bank notes and drawing paper. The essential material in the paper pulp is cellulose that is extracted from wood (or cotton or other plant material) through several processes, one being the groundwood process mentioned above, and the others being any of several chemical processes in which the wood is cooked. The best sources of paper pulp are those trees and plants that economically yield a large quantity of cellulose. When the cellulose is extracted, impurities and other components of the pulp source that would weaken the paper are removed; fortunately cellulose is resistant to the action of alkaline materials used in the papermaking process, so while the impurities are broken down, the cellulose remains intact.

While the use of wood pulp permits the manufacture of sufficent paper to meet the high demand, wood pulp paper is less permanent than that from cotton. Rare book librarians and collectors have expressed concern that books published in the past century will not survive as pre-nineteenth century volumes have.

The specific wood used in a specific paper depends on a number of factors, but primarily on the location of the mill that produces it. A mill in Erie, Pennsylvania, uses mostly oak and maple; a mill in the Carolinas uses a large quantity of southern pine; while the mill that manufactured the paper on which this article is printed, being located in Michigan, uses hemlock and spruce. This paper is a combination of those two woods. For ordinary considerations, the quality of paper is not contingent on the precise tree used, but is greatly controlled by the milling process. Although, generally speaking, soft wood trees (conifers) yield a cellulose fiber that is longer than hard wood (deciduous) trees, and long fibers make for a stronger paper. Often, fibers from softwood trees are mixed with those from hardwoods. Fiber length depends also on moisture and soil quality—a tree grown in rich soil with sufficient moisture will yield longer fibers than one grown in poor, dry soil. It also varies within a single tree; fibers are shorter in branches than in trunks; also, fiber length increases from the center outward in both the trunk and branches until the tree has reached its maximum height.

Other plants can also be used in the manufacture of paper. Hemp, jute, sugar cane, cereal straw and cornstalks all yield sufficient cellulose to be economically useful. It is possible to make paper from the leaves and stalks of several common garden flowers including iris, begonia, gladiola and nasturtium. Paper produced from these materials is unsuitable for writing unless mixed with another pulp. Most commercial pulp sold for this purpose is from banana leaves.

As part of its Festival of the Book Arts, the Missouri Botanical Garden Library will feature a display of "The Botany of Papermaking" from September 21 to October 16. The display will include specimens of plants used throughout the eighteen-hundred year history of the craft of papermaking, along with examples of common and unusual papers. The Festival of the Book Arts, a four-month program beginning September 1, will offer displays, workshops, demonstrations, lectures and films about many aspects of the art and craft of the book, including fine printing, calligraphy, book binding, paper marbling and papermaking. Further information on the Festival may be obtained by calling the Garden Library at 577-5155.

Maps: Where Did Nueva Granada Go?

She is dissatisfied with the way the paper is buckling as she brushes he paste over it. Repeatedly, she pulls at a corner of the paper to eliminate the wrinkles while spreading the methyl cellulose, but he paper is too fine and too large—a two-foot by three-foot sheet of ens paper—and the wrinkles do not disappear.

Rosemary Rudde is mounting a 9th Century sub-division map of St. Louis to preserve it; it is brittle and iddled with holes. "Probably eaten by ermites or roaches," she says. As she moves the map onto the sheet of lens paper coated with paste, a tiny irregular iece of the map flutter onto the ounter. She takes the piece and matches it against several holes before she finds the place from which it came; where the boundary lines match, and the letters on the piece complete a word on the map. Using the brush dipped in water, she smooths the map onto the lens paper that will now be its backing, then lays wool over the map to dry it, sets square pieces of half-inch thick wood on top of the wool to ensure that the map will dry flat, and weighs the boards with bricks wrapped in brown paper. The bricks are wrapped to keep dirt and attritus from the map. After the map dries, it is encased in plastic.

The map is one of more than 5,000 in the collection of the Garden's library, which includes maps from 17th century Africa to those of contemporary South America. The contemporary maps are used by researchers, planning field trips, to study the topography of the area to which they are going. Researchers also use old maps to locate place names inscribed on old herbarium specimens; a botanist working with a specimen collected in Nueva Granada in the 18th Century, by consulting a map of the period, would learn that today Nueva Granada is Colombia and know the geographic origin of the specimen. The collection also contains maps of St. Louis throughout its history which enable historians to study how the Garden fits into the geography of the area during the past century.

For the last six years, Rosemary Rudde has worked as a Volunteer in the Archives, caring for the map collection. She is a retired cartographer, having worked for the Aeronautical Chart and Information Center from 1943 until New Year's Eve 1969.

When she volunteered for the Garden she requested placement in the Herbarium because of her interest in Botany, but there were no positions available. At the time the Archives, organized not quite two years before, needed someone to maintain its map collection. Mrs. Rudde, with her experience as a cartographer was offered that position.

House Plants Grow Up

You know that three-foot philodendron that sits in a pot in your living room? Its relative is a vine that reaches over fifty feet toward the Climatron dome. "Philodendrons are more spectacular the higher they reach, growing up along trees," says Steve Frowine, Chairman of Indoor Horticulture at the Garden. "People that grow these as house plants should see one in a natural setting to really appreciate it."

Philodendron, schefflera, and rubber tree growers will have the opportunity to see their favorite house plants in their mature form in an exhibit in the Climatron from September 26 through October 11, 10 a.m. until 5 p.m. The exhibit will contain approximately 100 plants throughout the Climatron, each displayed with a label that includes cultural information.

Where Do Bananas Come From?

When most of us buy our bananas, we pick a bunch from a table in a supermarket or a produce store, inspect it for bruises, pay for it and take it home. Vanilla comes in little bottles we store in a spice cabinet; coffee comes from jars or cans. Coconut is shredded and is contained in plastic bags on the grocer's shelf. Buying food this way, it is easy to forget the natural origins of the things we eat.

From October 31 until November 29, the Garden will feature an exhibit of tropical and sub-tropical food plants in the Climatron. About sixty-five plants will be displayed, including the banana, papaya, coconut, vanilla, yams, coffee, oranges and lemons. Each plant will be exhibited with descriptive text. Hours of the exhibit are 10 a.m. until 4:30 p.m.

Education Department Fall Workshops

A practical course in rose care and culture will initiate the fall series of continuing education workshops offered through the Education Department. David Vismara, Garden Rosarian, will conduct the four-session class which begins September 8. Sessions will focus on the selection and ordering of plants, bed preparation and planting, fertilizing and mulching. One session will be held in the Rose Garden on the grounds of the MBG. Evening sessions are scheduled for September 8, 15, and 22 and will run from 7:00 to 9:00 p.m.; the Saturday field session is scheduled for September 12 from 10:00 to 12:00 a.m. The fee for Members is $18.00. To register, contact the Education Department, 577-5140.

Nancy Morin, Administrative Curator of the Herbarium, has designed a mini-course in botany fo the non-botanist—interested amateurs, teachers, and others interested in increasing their knowledge of plant classification and identification. The four-session workshop is scheduled for September 15, 22, 29 at 7:00 to 9:00 p.m. A field day is scheduled for September 19. The fee for Members is $13.50.

The Arboretum has scheduled programs which include walking tours of that 2400-acre nature reserve. "Evening Hikes at the Arboretum" will be held on one evening a month through autumn beginning September 18 at 8 p.m. "Autumn Walks" will be offered on Tuesdays from September 29 through October 27, and "Macro Nature Photography 'Walkshop' " is planned for Sunday, September 27.

Other workshops scheduled for early fall include: Advanced Photography; Evening Walks in the Japanese Garden; Principles of Residential Landscape Design; Photography for Children; A Child's Garden: A Course for Adults; Plants in Poetry: A Course in Creative Writing; Prairie Restoration.

Pre-registration is required for all classes. For information on fees and schedules, please contact the Education Department (577-5140), or the Arboretum (577-5138).

Fall Lectures

Mrs. Rosemary Verey will open the Garden's series of Fall Lectures on Tuesday, October 6, at 10:30 a.m., with a special presentation entitled "Gardening in the Cotswolds." The Cotswolds are hills in Gloucestershire in southwest-central England. Mrs. Verey, co-editor of *The Englishwoman's Garden* and the author of a book on English women gardeners, will be in the United States to deliver the First Annual Plantman's Lecture at Wave Hill in Riverdale, New York in September.

The Fall Lecture Series continues on October 14, with Dr. Nancy Morin presenting a talk on the pre-1900 scientific work of the Garden. Dr. Marshall Crosby presents "Dr. William Trelease and the early twentieth century research of the Garden" on October 21, and Dr. William D'Arcy presents a lecture on the Flora of Panama Project on October 28. The lectures will be held at 10:30 a.m. and 8:00 p.m. on the scheduled dates in the John S. Lehmann Auditorium and will continue through November.

Two September Sales

Both of the Garden's shops will feature sales during September. On Sunday, September 13, the Garden Gate Shop will have its annual Sidewalk Sale from 9 a.m. until 5 p.m. The sale will offer china, gifts, trays, vases and accessories at prices reduced by twenty to fifty percent from regular retail prices.

On September 25, Garden Members are invited to a preview of the Plant Shop's Fall Plant Sale. Members will receive a twenty percent discount on all items in the shop, including foliage plants, spring bulbs, trees and shrubs, bonsai, tropical plants, and plant care materials. On September 26 and 27, the sale will be open to the public who will receive a 10% discount on all purchases.

SCAPINO in the Garden

Theatre Project Company will open its seventh season with a performance of SCAPINO at Missouri Botanical Garden from September 17 to 20. Directed by Courtney Flanagan, the play is an adaptation of *Les Fourberies de Scapin* by the seventeenth-century French dramatist Molière.

"We selected this particular play because it is well-suited for outdoor production," said Fontaine Syer, Artistic Director of Theatre Project Company. "It's full of mistaken identities, clowns and juggling. It is broad comedy that can be appreciated by all ages."

Performances are scheduled for 8 p.m. on all days, with a 2 p.m. matinee on Sunday, September 20. Garden members will receive a discount from the price of admission to SCAPINO. The presentations of SCAPINO are sponsored by the Seven-Up Company.

Answer Service Seeks Volunteers

The Missouri Botanical Garden Answer Service is seeking men and women who are knowledgeable and experienced in home gardening.

The Horticultural Answer Service was established nearly 20 years ago and today responds to more than 12,000 telephone inquiries each year regarding lawn and garden problems. Volunteers participate in an extensive training program that includes seminars on subjects ranging from insect control to lawn care, pruning, and diagnosis of disease. Training sessions are scheduled from November through February.

Applications are available in the Education Department (577-5140), and must be submitted by September 15.

Tower Grove House Fall/Winter Menu

The fall/winter menu for luncheons in the Tower Grove House Tea Room will be available beginning Thursday, October 1. That menu includes Chicken Divan, Lasagna, Turkey au Gratin, and Spinach Quiche.

Luncheon is served at Tower Grove House on Tuesday and Thursday of each week, except holidays, 11:30 a.m. to 1:00 p.m. Reservations are necessary, and must be made by noon Monday for Tuesday luncheons and by noon Wednesday for Thursday luncheons. Meals must be ordered at the time of reservation. Groups of fifteen or more may schedule luncheons for Mondays, Wednesdays or Fridays by making special arrangements with Tower Grove House. For information or reservations, please call 577-5150.

C.P. Whitehead Dies

Charles Powell Whitehead, President of the Garden's Board of Trustees from 1970 until 1972, died on June 22 at the age of 81. He was elected to the Board in 1964, and was an important participant in the 1969 Capital Fund Drive that made possible the construction of the John S. Lehmann Building which houses the Garden's herbarium, library and educational department. It was during Mr. Whitehead's term as President that the building was constructed.

Mr. Whitehead was president of General Steel Industries from 1945 until 1964, and was board chairman from 1964 until 1966. He was active in many civic activities in both Missouri and Illinois including the United Fund Drive, the Arts and Education Fund, the Symphony Development Fund, the YMCA and the Municipal Opera. In 1968, he was selected as the St. Louis *Globe-Democrat* Man of the Year. In 1980, he was elected an honorary trustee of Missouri Botanical Garden.

500 Years of Botanical Illustration Exhibit

The exhibit, *500 Years of Botanical Illustration,* which was first shown at the Garden in January, 1980, will be repeated as part of The Festival of the Book Arts from October 15 through November 30. The exhibit includes significant examples of botanical art from the Garden's extensive collection, documenting the development of scientific botanical illustration and the use of plants as decorative art.

500 Years of Botanical Illustration has been shown in museums throughout the midwest since November, 1979, by the Mid-American Arts Alliance and has proven to be the most popular touring exhibit in M-AAA's history. It is scheduled to tour through the end of 1982, and the M-AAA has commissioned the Garden to create a second exhibit in botanical illustration, using different examples from the library's collection.

The hours of the exhibit located in the John S. Lehmann Building, will be 9 a.m. to 5 p.m., Monday through Friday.

Euphorbia Exhibit

Euphorbia is a diverse plant genus that includes the commonly known plants poinsettia and crown of thorns, but also includes some interesting and economically important species as well. *Euphorbia tirucalli* is considered a possible source for a gasoline-like fuel. Another species, *Euphorbia phosphorea,* glows in the dark.

These four plants, and others from the *Euphorbia* collection at Missouri Botanical Garden, will be featured in an exhibit in the Desert House from October 17 through November 15. Hours of the exhibit until the end of October are 9 a.m. to 5 p.m. After November 1, the exhibit will be open from 9 a.m. until 4:30 p.m.

Scented Garden Moved

The Scented Garden, originally located on the Knolls, south of the Main Gate, has been moved to the southeast side of the Linnean House. According to Alan Godlewski, Chairman of Landscape Horticulture, plantings will be installed in September and October. "Visitors will start seeing the first real displays in early Spring, with the height of the Garden coming around May first," he said.

Trees and shrubs scheduled for fall planting include several species of honeysuckle, lilac, calycanthus, and yew. The Scented Garden was first opened in May, 1972.

Bring-A-Guest Weekend

On Saturday and Sunday, September 12 and 13, all Members are invited to bring two guests to the Garden. Guests will be admitted free of charge when they present the coupon (right) at the Main Gate. Any current Member whose guest joins the Garden on that weekend will receive a botanical illustration (suitable for framing) or a free plant as a token of appreciation from the Garden.

Coupon for Bring-a-Guest Weekend
September 12-13
(Member's guest must complete coupon and present at Main Gate for admission.)

Name

Address

City State Zip

Goudy Appointed Museum Director

David Goudy, formerly the Garden's Assistant Director for Operations, was appointed Director of Montshire Museum in Hanover, New Hampshire, in July. Montshire is a ten year old natural history museum associated with Dartmouth University.

Goudy joined the Garden's staff in 1969, working part-time to develop a work-study program for potential high school drop-outs. In 1970, he was appointed Superintendent of the 2400-acre Shaw Arboretum in Gray Summit. He was named Director of Public Services in 1977 and Assistant Director for Operations in 1979. In this last position he directed the education, horticulture and maintenance departments. During the last two years, he also managed the construction of the Visitor Center at the Garden's north end.

"The Garden is a marvelous institution. It has been doing some very creative things, and I'm pleased to have had the opportunity to have participated in them," Goudy said. "The building program is especially exciting and forward-looking. When it is completed, it will be a tremendous boost to all the programs here."

Coupon for Bring-a-Guest Weekend
September 12-13
(Member's guest must complete coupon and present at Main Gate for admission.)

Name

Address

City State Zip

Calder Sculpture for Garden

In early June, Alexander Calder's sculpture, "The Tree, was removed from the Promenade area at the Mansion House and delivered to Davlan Engineering, where it will be restored for exhibition near the the new location planned for the Boxwood Garden. The site chosen for its installation at Mansion House proved damaging to the piece because of wind conditions. The loan to the Missouri Botanical Garden was arranged through the efforts of Robert H. Orchard, Chairman of Mayor's Committee on St. Louis Arts and Fountains, and Gerald A. Rimmel, a St. Louis attorney. Thanks to their concern for the preservation of the piece, Calder's mobile will be available for viewing in an appropriate setting towards the end of this summer.

Landscape Design Course Offered

The second in a series of Landscape courses offered by the National Council of State Garden Clubs, Inc., will be offered on October 12, 13 and 14, 1981, at the Lehmann Building of the Missouri Botanical Garden, 2345 Tower Grove Avenue. There are no prerequisites for this course and it is open to the public.

Outstanding instructors in the fields of horticulture, botany, and landscape design have been scheduled to teach the following topics: "Development of Landscape Design from 1840 to 1930," "Urban Design," "Architecture and Related Professions," "Landscape Graphics," "Execution of Landscape Architectural Design," "Site Design," "Art and Nature Appreciation," "Plants in Composition," and "Elements in Landscape Architectural Design."

The faculty teaching these courses is: Douglas Counts, Robert Goetz, Fred Kellams, and Stuart Mertz—landscape architects; and Dr. Gary Long, Dr. Ray Rothenberger, and Prof. Willard Summers, University of Missouri horticulturalists.

The course fee is $25.00 for two days, $15.00 for one day, and $2.00 examination fee for those taking the optional exam. The course is sponsored by the Federated Garden Clubs of Missouri, Inc., the University of Missouri Extension-East-West Gateway Area, Missouri Botanical Garden, and the National Council of State Garden Clubs, Inc. For further information contact: Glenda Finnie, 4623 Littlebury, St. Louis 63128 (894-2655).

Orchid Sale

Because of the success of last November's Orchid Sale, a second sale is planned for this year. Scheduled for Saturday, November 14, 10 a.m. to 4 p.m., with the Preview Sale on Friday, November 13, from 7 p.m. to 9 p.m., the sale will offer individuals the opportunity to purchase orchid plants from the Garden's internationally renowned collection. Over 1,000 plants will be available and persons with questions on orchid culture may talk with experts from the Garden's staff and members of local orchid societies. Proceeds from the sale will be used to purchase new plants for the Garden's collection and an orchid display case. For further information, members may call 577-5190. There is a $5.00 admission fee for the Orchid Preview Sale on November 13.

Fall Flower Show

The 1981 Fall Flower Show opens to the public on Saturday, October 3, and continues through October 24. The show this year will be a gardenwide exhibit of chrysanthemums and other traditional fall flowers.

A Members'-only preview party is scheduled for Friday, October 2. Details will be announced later by mail.

The St. Louis Herb Society will begin selling hand-crafted items in Tower Grove House beginning November 12. Items will include lavender sticks, tea cozies, potpourri, herb apple wreaths and woven wheat. Tower Grove House, the country home of Garden founder Henry Shaw, is open from 10 a.m. until 5 p.m. through October. From November through April, it closes at 4 p.m.

Dr. Raven Elected President of A.S.N.

Dr. Peter H. Raven, Garden Director, was elected President-Elect of the American Society of Naturalists earlier this year. The Society, founded in 1883, is an international organization of persons interested in a variety of biological disciplines. Its purpose is the advancement and diffusion of biological knowledge.

Cohen Court Announced

The Sidney and Sadie Cohen Foundation recently contributed funds to the Garden for the construction of a garden in memory of Sadie M. Cohen. The garden, to be located on the east side of the Linnean House, will be approximately 1,600 square feet and will contain a brickwork courtyard, trees, hedges and a granite drinking fountain. It is scheduled for completion by the end of this year.

5-6-Pick Up Sticks...

The Education Department has recently developed a new activity for young children called "The Collector's Bag"; its purpose is to encourage children to collect leaves, seeds, and other natural, fallen objects from the ground when they visit the Garden, in order to help them study and understand plant life.

According to Ilene Follman, coordinator of the project, "Small children are much closer to the ground than adults and often observe things that bigger people do not notice. Many interesting and lovely seeds, leaves, flower petals and other plant parts fall to the ground at various times during the year. Children can learn a great deal from these unattached objects."

"The Collector's Bag" is available at the Main Gate for a nominal fee.

Reservations Available for China Tour

A few reservations are still available for the Spring, 1982, China Tour, led by Tamra Engelhorn Raven. The tour, which leaves St. Louis on April 24, 1982, will visit Beijing, Hanjing, Wusi, Shanghai, and Kyoto, Japan, returning to St. Louis on May 13, 1982. For information or reservations, Members may call 577-5118.

Calendar

September

No spring nor summer beauty hath such grace
As I have seen in one autumnal face.—J. Donne

September 1-5	**Monster Cacti Exhibit,** Desert House, Continues through September 6, 9 a.m.-5 p.m. **Henry Shaw Cactus Society Show,** John S. Lehmann Building, continues through September 7, 9 a.m.-5 p.m. **Guild of Bookworkers 75th Anniversary Exhibition,** part of the Festival of the Book Arts, John S. Lehmann Building, opens September 1, 9 a.m.-5 p.m., week-days only (through October 1).
September 6-12	**Labor Day Picnic at the Garden,** Garden grounds, September 7, 9 a.m.-6 p.m. A nice day for the family; bring a picnic or buy one in the Greenery. **Bring a Guest Weekend,** Grounds, September 12-13, 9 a.m.-6 p.m. **Guild of Book Workers' 75th Anniversary Exhibition:** Continues
September 13-19	**Garden Gate Shop Sidewalk Sale,** Main Gate, September 13, 9 a.m.-5 p.m. **Men's Garden Clubs' Fall Show,** John S. Lehmann Building, September 19-20. 1-5:30 p.m. on the 19th; 9 a.m.-5:30 p.m. on the 20th. **SCAPINO,** Grounds, September 17-20, 8 p.m. (with 2 p.m. matinee on the 20th) **Guild of Book Workers' 75th Anniversary Exhibition:** Continues
September 20-30	**Botany of Papermaking Exhibit,** John S. Lehmann Building, opens September 21, 9 a.m.-5 p.m., weekdays only (through October 16). **Fall Plant Sale,** Plant Shop, (members' preview, September 25; regular sale, September 26-27) 10 a.m.-5 p.m. **Dahlia Society Show,** John S. Lehmann Building, September 26-27, 10 a.m.-5 p.m. **Houseplant Exhibit,** Climatron, opens September 26, 10 a.m.-5 p.m. (through October 11). **Guild of Book Workers' 75th Anniversary Exhibition:** Continues

October

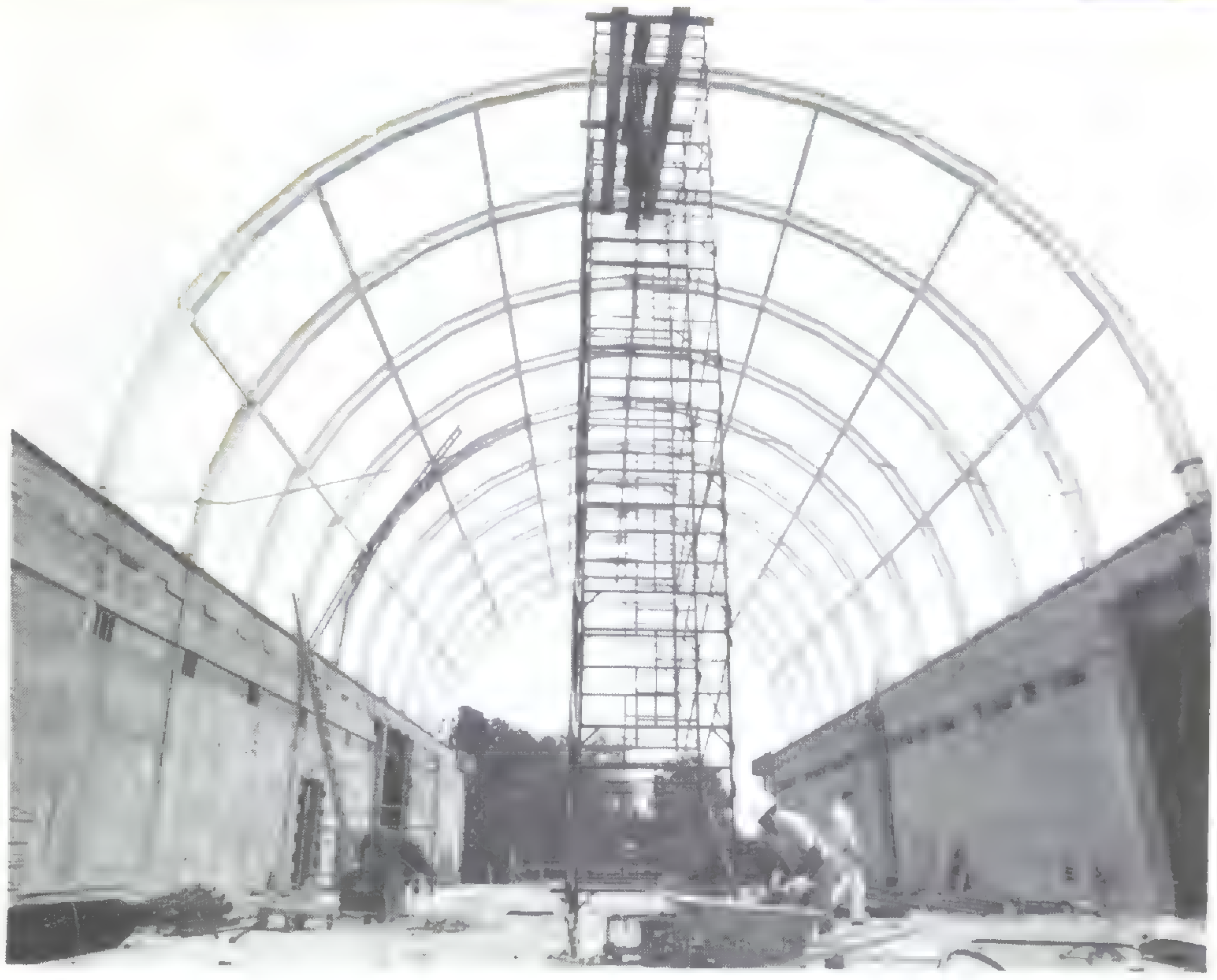
Listen! the wind is rising,
and the air is wild with leaves,
We have had our summer evenings,
now for October eves!—H. Wolfe

October 1-10	**Fall Flower Show Preview Party,** Grounds, October 2, 6 p.m. to 8 p.m. **Fall Flower Show,** Grounds, opens October 3, 9 a.m.-6 p.m. (through October 24). **Rosemary Verey Lecture,** John S. Lehmann Building, October 6, 10:30 a.m. **Houseplant Exhibit:** Continues (last day October 11) **Botany of Papermaking Exhibit:** Continues
October 11-17	**Lecture:** "Shaw and Engelmann and the Garden's research before 1900", John S. Lehmann Auditorium, October 14, 10:30 a.m. and 8 p.m. **500 Years of Botanical Illustration,** John S. Lehmann Building, opens October 15, 9 a.m.-5 p.m., weekdays only (through November 30). **Euphorbia Exhibit,** Desert House, opens October 17), 9 a.m.-5 p.m. (through November 14). **Fall Flower Show:** Continues **Botany of Papermaking:** Continues (last day, October 16)
October 18-24	**North American Hand Papermaking Exhibit,** John S. Lehmann Building, opens October 19, 9 a.m. -5 p.m., weekdays only (through November 30). **Lecture:** "Dr. William Trelease and the early 20th Century research of the Garden" John S. Lehmann Auditorium, October 21, 10:30 a.m. and 8 p.m. **Fall Flower Show:** Continues (last day October 24) **500 Years of Botanical Illustration:** Continues
October 25-31	**Lecture:** "The Flora of Panama Project", John S. Lehmann Auditorium, October 28, 10:30 a.m. and 8 p.m. **The Art of the Printer Exhibit,** John S. Lehmann Building, opens October 25, 9 a.m. to 5 p.m., weekdays only, (through November 10). **Wood Engraving Exhibit,** John S. Lehmann Auditorium, October 27, 9 a.m.-5 p.m. **Food Plants Exhibit,** Climatron, opens October 31, 10 a.m.-5 p.m. (through November 29). **500 Years of Botanical Illustration:** Continues **North American Hand Papermaking Exhibit:** Continues

Visitor Center to Add New Curve to St. Louis Skyline

Workers installed the framework for the dome-shaped concourse roof of the new Visitor Center at Missouri Botanical Garden in July. The concourse, a 160-foot long public atrium, will be covered by a sixty-foot high translucent archway and will serve as the main visitor walkway for the center as well as a showcase for exhibits and displays that represent the history and purpose of the 122-year-old Garden.

The archway's translucent covering, to be completed this summer, will be constructed from a double-walled, insulated, ranslucent panel that is highly thermal efficient and one of the ew plastic, translucent materials that meet the rigid fire codes applied to public buildings. The Visitor Center at the Garden is he first structure in the Midwest and one of the first in the country to use the material on a large scale.



New Membership—June and July 1981

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Tributes-June & July 1981

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Mr./Mrs. Howard Baer
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Mr./Mrs. Harry Franc
Mr./Mrs. Irving D. Goldman
Mr./Mrs. John Isaacs, Jr.
Mrs. Edwin Levis
Mrs. Lawton Levy
Mr./Mrs. Willard L. Levy
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A Conversation With Peter H. Raven

Dr. Peter H. Raven became Director of the Garden in August, 1971. He has been an Associate Professor at Stanford University, a John Simon Guggenheim Memorial Fellow, and a taxonomist and curator at the Rancho Santa Ana Botanic Garden. He is a member of the National Academy of Sciences, a Fellow of the American Academy of Arts and Sciences, and a Foreign Member of the Royal Danish Academy of Sciences and Letters. This past August he received the prestigious Distinguished Service Award from the American Institute of Biological Sciences; in September he was Vice President of the Thirteenth International Botanical Congress (the Congress meets once every six years). He is the author of numerous scientific works, a member of two dozen committees and a score of societies, and an editor for several publications. During the decade in which he has been Director, the Japanese Garden was constructed as were the Anne L. Lehmann Rose Garden and English Woodland Garden; the John S. Lehmann Building was completed, the Linnean House restored, and construction of the Visitor Center begun. The number of Garden Members increased from 2,800 to over 14,000, and the size of the research program quadrupled to become the world's most active tropical botany program. In addition to being Garden Director, Dr. Raven is Engelmann Professor of Botany at Washington University, and an adjunct professor of biology at both St. Louis University and University of Missouri-St. Louis.

Bulletin: Reviewing the past decade, what would you say was the most significant accomplishment?

Dr. Raven: Actually there are two. The building of the scientific staff so that it contributes in a large way to the knowledge of the tropical sciences; it has increased to about four times its size of ten years ago. The Garden is now among the finest botanical institutions on the globe. Second, we have begun and implemented a Master Plan for the first time in the Garden's history. This includes the Japanese Garden, the English Woodland Garden, and the Visitor Center that we've almost completed.

B And the Center is the culmination of the Master Plan.

R Yes, and when the Center opens, it will be easier going from then on. There are still quite a few things to do — the home landscaping center, the boxwood garden. We have to continue to improve our activities and displays.

B What about the future, the next decade and beyond?

R Our major goals are twofold. First, securing tax support is important to insure a diverse financial base so that the Garden can meet the demands of the coming decade and continue forward. Second, the Garden's educational role will be its main area of concentration for the future. We ought to be able to make major contributions to the community for education in horticulture, botany, ecology. The Garden as an educational institution in the broadest sense will be its greatest contribution for the future.

B Traditionally, the function of the Garden has been divided into three parts, display, research and education. During the past ten years, display and research have been greatly

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Comment

Dr. William Tai of Michigan State University and I visited Beijing (Peking) from July 6 to 9, 1981, on behalf of the Botanical Society of America. For several years I have been coordinating exchange as Chairman of the Society's Committee on Scientific Interchange with the Botanists of the People's Republic of China. In Beijing we had several fruitful discussions with officials of the Chinese Academy of Sciences, including Professor Tang Pei-sung, Director of the Botanical Institute; Professor Yü Te-tsun, Assistant Director of the Botanical Institute and head of the Editorial Committee of the *Flora of China* project; and Mr. Su Feng-lin, of the Foreign Affairs Bureau of the Academy of Sciences, all of whom visited St. Louis as members of the delegation of Chinese botanists in May, 1979. Our current trip was supported by a grant from the Rockefeller Foundation to the Botanical Society of America for the coordination and promotion of interchange with the PRC in the field of botany.

Discussions continued on the means by which we might bring about the production of an English translation of the *Flora of China*, a collective work that has been in progress since 1957; over 200 Chinese botanists are involved in the project. The final work will consist of 80 volumes with 5,000 full-page illustrations and will describe the approximately 30,000 species of plants found in China, about one-eighth of all those in the entire world.

Other items that we discussed included the interchange of people between botanical institutions in our two countries. In residence in St. Louis now are Dr. Wu Peng-Cheng of the Institute of Botany, Chinese Academy of Sciences, Beijing, who is studying mosses with Dr. Marshall Crosby,

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Letter From China

My first few days in China were spent in Shanghai where I visited the Shanghai Botanical Garden; it is a new garden still being constructed. The major feature is a traditionally styled peony garden. There are over 200 cultivars of peony in this garden with the primary species being Tree Peony or *Paeonia suffruticosa*. In order to provide adequate drainage for the peonies, they had to construct an artificial hill. Other featured spring plants included Magnolia, cherry and holly.

A second area was one for hybrid roses; here roses were featured in a western-style garden with an Oriental flare — the trellis work was of bamboo, as was the entrance gate, with the traditional upturned corners so common in China.

The next area of interest was the Chrysanthemum garden, designed around a pool with a traditionally-styled pavilion. In the newer Chinese gardens these traditional structures are made from concrete rather than wood as in ancient times and there is an expressed concern that fine wood-craftsmen no longer exist or are, at the best, very rare. The chrysanthemum garden will, as one might suppose, be a fall feature. Here many cultivars will be displayed showing a great deal of variation. One prize-winning plant from last year was described to me — it has over 3,000 flowers uniformly in display and was over 3 meters round. These are shown in late November and I am sure are a sight to behold.

The last, and probably the finest feature, was the collection of *pen ching*, which translates as "scenery in a pot." It is equivalent to the Japanese concept of bonsai. The *pen ching* art form was started in the Tang Dynasty almost 1200 years ago. There are two types — one uses plant material only, and the second, stone. The stone variety generally represents a mountain scene in miniature and may or may not have plant material associated with it. The favorite materials for *pen ching* include pine, especially a short needled white pine (*Pinus densiflora*), pomegranate (*Punica granatum*), wisteria (*Wisteria sinensis*), Chinese juniper (*Juniperus chinensis*), sasanqua camellia (*Camellia sasanqua*), Chinese elm (*Ulmus parvifolia*), trident maple (*Acer buergeranum*), and may other plants.

Next in Shanghai we visited the Yu Yuan (Yuan means garden). It is of the characteristic architectural style of the Ming (A.D. 1368–1644) and Ch'ing (A.D. 1644–1911) dynasties. Its visual beauty captures the essence of landscape design as it existed during these periods. It was built initially during the years A.D. 1559 to 1577 for a landlord and official of the Ming Dynasty. The area is only 3.75 acres but gives the feeling of a much greater expanse. This is due to the contrived perspective of its design including short bridges of small scale, divisions into three-walled sections, many winding passages (none are in a straight line), and waterways which lead under walls with a promise of more beyond. There are more than 30 halls in Yu Yuan in the traditional style and a stone mountain surmounted by a lovely pavilion. A favorite feature of mine was the three undulating walls that were actually the spine of a great dragon — dramatic and effective. I shall be next in Nanjing, our sister city to St. Louis, and home of the Hortus Botanicus Nanjingeusis Memorial Sun Yat-Sen, our sister botanical garden.

Alan P. Godlewski,
Chairman of Landscape Horticulture

Note: The Garden Members' Tour of China, scheduled for April 24 through May 13, 1982, will visit the Shanghai Botanical Garden. For further information, please call 577-5118.

Notes from the Botanical Congress

The Garden was well represented at the XIII International Botanical Congress held in Sydney, Australia, from August 21 through 28. Seven Garden botanists were among the three thousand who attended this important Congress which convenes once every six years. Dr. Raven, who was a vice president of the Congress, delivered one of the Congress General Lectures entitled "Research Priorities in Tropical Biology." In addition, he organized and convened two symposia, "Plant geographical results of changing Cenozoic barriers," and "Myrtales: composition and relationships." Contributors to these symposia were drawn from the international pool of specialists in the areas concerned. After the Congress, Dr. Raven delivered a series of lectures on Australian biogeography and continental drift and discussed this topic and others, particularly the plight of the tropical rainforest. This lecture tour included Brisbane, Canberra, Adelaide, Perth, Melbourne, and Sydney, and was made possible by a Rudolf Lemberg Travel Fellowship from the Australian Academy of Science. The Academy grants one such fellowship per year to an expert in biochemistry, Australian plants, or conservation.

Other Garden botanists attending the Congress were Alwyn Gentry, Thomas Croat, William D'Arcy, Peter Goldblatt, and Marshall Crosby. Most took advantage of the travel opportunity to undertake field work or other studies. Before the Congress, Dr. Gentry visited Gabon, Nigeria, and Malaysia to conduct sampling studies of the species diversity in various tropical forests. After the Congress he continued these studies in New Caledonia, where the Garden maintains a field station for collecting and studying the flora of New Caledonia. Dr. Crosby also visited New Caledonia to collect and study mosses. After the Congress, Dr. Croat conducted field work in New Guinea, the Phillipines, Malaysia, and Thailand on the aroid family (Araceae) in which he is particularly interested. Dr. D'Arcy visited India to discuss the upcoming international congress on Solanaceae which will be held at the Garden in August, 1982, then proceeded to France to visit several herbaria to study specimens of Solanaceae (potato family) important to his general research in this family. Dr. Goldblatt went from Australia to South Africa to continue his studies of the iris family (Iridaceae).

Marshall R. Crosby, Director of Research

A caption in the September/October *Bulletin* mistakenly identified Mr. Russell E. Egan, the sponsor of the Garden's bill in the Missouri House of Representatives, as the Speaker of the House. Mr. Egan represents the 85th district which includes the Garden. Mr. Robert Griffin is the Speaker of the House.

A Conversation

(continued from page 1)

enhanced, so now the Garden will concentrate on the other third, education. Correct?

R Yes. Education not only through classes and lectures, but through its publications and displays — the information it provides. For example, there is very little material readily available telling visitors about what they see in the Garden — information about the trees and plants. Not that we want people overwhelmed with information, but if someone wants to know something about a particular plant they will be able to easily find out about it. The Garden should have an aggressive posture for education. Not only in the community, but beyond it. The Garden can — and does — make a national and international contribution through its work and the information it makes available on tropical regions and plants in general — information that can be the basis to solve the problems we face in food and energy shortages.

B What role does the Visitor Center have in all this for the future?

R The Center is very important since it will contribute greatly to our ability in education. For the first time, the Garden's message can be expressed in the greatest sense on all levels. It can help people understand the Garden when they visit. On the level of students who come for classes, the improved and increased facilities will aid our staff in educating them.

B Why should people support the Garden through the Tax District?

R So that the Garden can live up to its promise to make the fullest contribution it can. So that it can, specifically, continue to be a major tourist attraction and to be an important anchor for the neighborhood and St. Louis. And to provide a stable institution through which we can continue to make our scientific contributions. St. Louis has one of the finest institutions of its kind in the world in this Garden. When it is at that level, you want to keep it that way.

Comment

(continued from page 2)

the Garden's Director of Research. Dr. Chin Hui-chen of the Jiangsu Botanical Institute, Nanjing, our sister botanical garden in China, is working on experimental plant classification in my laboratory and will be in St. Louis until the end of the year. In early November Dr. Chen Chi-jui of the Institute of Botany in Beijing will arrive. Dr. Chen will be working with Dr. Peter C. Hoch and myself on *Epilobium*, a genus of plants that we have been studying for some 20 years. Dr. Chen will be in St. Louis for about 15 months, during which time we will complete a revision of the genus *Epilobium* in China, where there are about 40 species.

We also laid plans for a symposium on relationships between the plants of eastern temperate Asia and eastern temperate North America to be held in St. Louis September 30–October 2, 1982. Both Chinese and American scientists will participate in this symposium which should be useful in promoting further understanding of the plants of our two countries.

Alan Godlewski, our curator of Landscape Horticulture, has just returned from a two-month trip to China and Japan under the sponsorship of the Jiangsu Botanical Institute.

Peter H. Raven

Lecture Series Continues

The Fall Lecture series continues into November with two lectures. On November 4, Dr. Peter Goldblatt, the B.A. Krukoff Curator of African Botany, will talk on "Exploration in Southern Africa." On November 11, Garden Director Dr. Peter H. Raven concludes the series with a talk entitled "The Future of Plant Exploration." Both lectures are held in the John S. Lehmann Auditorium and are scheduled for 10:30 a.m. and 8:00 p.m. on the days indicated.

Book Arts Festival Continues

The Festival of the Book Arts continues through November and December with exhibits of botanical illustration, hand made papers, and marbled and decorated papers.

500 Years of Botanical Illustration, the highly successful touring exhibit of material from the Garden's archives, will be displayed in the John S. Lehmann Building through November 30 featuring significant examples of botanical illustration and the use of plants as decorative art. Since it was first exhibited at the Garden in January, 1980, the exhibit has toured the midwest through the sponsorship of the Mid-America Arts Alliance and has become their most successful touring exhibit to date.

Also featured in the library through November 30 is the **North American Hand Papermaking Exhibit.** First created in 1976 by the Center for Book Arts in New York City, the exhibit includes samples of hand made paper from 32 prominent artists. The **Village Voice** said "No two things are alike in this fine show where the best instincts and talents of artists and craftsmen meet." The exhibit is accompanied by a statement from each artist on his work.

From December 1 through 30, the Festival concludes with the **Marbled Papers Exhibit.** The exhibit will include a variety of marbled papers, some several centuries old and some made by comtemporary artists. It will also include a selection of printed papers and other decorated papers used in book binding and as end papers.

All three exhibits will be held in the John S. Lehmann Building and are open Monday through Friday, 9 a.m. through 5 p.m.

Shaw, Engelmann Course Offered

The Education Department offers a course on the lives and works of Henry Shaw and George Engelmann during November. Entitled "Henry Shaw and George Engelmann: Their Roles in Founding the Garden, St. Louis, and Opening the West"; the course meets for two sessions, on November 11 and 18, 7 to 9 p.m. The fee is $12 for Members.

Gardening in St. Louis

Holiday Plant Care

Poinsettias are probably the most common plants to decorate homes during the holidays. This year there are several shades of red, pink, and white from which to choose.

For a striking accent, try a hanging basket poinsettia or stack several plants on inverted pots of various sizes to fill a corner with festive color.

Modern poinsettias are tough plants. It used to be a common complaint that these plants dropped their leaves before the holiday season was over but today's plants will retain their color well into late winter and early spring. To assure long-lasting plants, place them where they will receive diffused light and not an excessive amount of heat. Put pots into plastic or ceramic platters to protect carpet or furniture.

Other popular holiday plants include the Jerusalem cherry (*Solanum pseudocapsicum*), the Christmas pepper (*Capsicum sp.*) and cyclamen (many species and varieties).

Bright red berries of the Jerusalem cherry look much like cherry tomatoes. This plant is from South Brazil and Uruguay where it enjoys a bright, cool growing environment. When in full fruit, it needs to be watered frequently — sometimes once a day. New Jerusalem cherry plants can be started from seeds extracted from the fruits. Sow the seed in March for mature plants next December.

Within the past several years, the Christmas pepper, which bears small white flowers and shiny, red, miniature peppers, has become a popular holiday plant. Its cultural requirements are similar to those of the Jerusalem cherry. If you start this plant from seed, allow six to eight months for a mature plant.

The colorful flowers of the cyclamen look like shooting stars dangled over beautifully patterned, heart-shaped leaves. Unfortunately, the usual cyclamen plant purchased from a florist is not very well suited to the growing conditions found in most homes. It prefers a cool (50-55 °F) bright window. If placed in a warm, dimly lit living room, the foliage soon stretches and the blooms fade. For more success, try the dwarf varieties mentioned below.

Cyclamen can be grown from seed in a cool greenhouse, a cool, bright window, or in a hot bed. Seeds sown in August and September will produce blooming plants for the next holiday season.

Note: A display of the holiday plants mentioned will be held in the Climatron from December 5 through 24, 10 a.m. ° 4:30 p.m.

Christmas Tree Care

Christmas trees will last for a long period if the following method is used:

First, saw the tree stem to fit the holder. Then take a sharp axe to chop the end of the stem or a hammer or blunt instrument to crush the end. Place the tree in a holder that contains at least a gallon of water. In a container mix:

- 4 Tbls. Green Guard Micronized Iron
- 2 cups corn syrup
- 4 tsp. chlorine bleach

Place this solution into the tree holder and allow the tree to stand about 12 hours before decorating. Add tap water at room temperature to the container each day.

New Houseplants To Try

Thanks to the efforts of various horticultural hybridizers, many new plants are appearing in catalogs and in floral shops. Some of the outstanding ones include: **Helena** and **Bambini Cylcamen.** These charming cyclamen are dwarf growers with beautiful foliage. They are heat-resistant, bloom for a long period (usually 8 or 9 months) and come in various colors. We have been growing the white Helena in our greenhouses for over a year and have been amazed how they have continued to bloom through the hot summer months. These plants will probably not be available from your local garden supplier, but you can obtain seeds from various mail order suppliers, including Park Seed Company, Greenwood, South Carolina 29647.

Streptocarpus - Many different Streptocarpus hybrids are appearing on the houseplant market. The new hybrids are compact growers, bloom almost constantly, and come in many different colors. They will provide continuous bloom as long as they receive enough light and do not become too warm. The ideal conditions for these plants include a bright, sunny window such as an eastern exposure in a cool spot where the temperature range is between 55° and 75°F. Some of these new hybrids are available in our own plant shop as well as from some of the local garden centers.

Dwarf Crepe Myrtles - An exciting new plant which should prove to be a real show stopper is the mini crepe myrtle plants. These plants can be grown in pots or hanging baskets and will provide beautiful flowering through the summer months. They can withstand 120° (F) in full sun and are hardy to 10°. This would mean, of course, that these plants do have to be wintered over in the home but can be put outside in the spring as soon as temperatures warm up and can be expected to bloom for up to five months of the year if they receive enough light. The plants come in various colors. As of this time I only know of one company that has these unique plants, and it is a mail order firm called Greenlife Gardens Greenhouses, 101 County Line Road, Griffin, Georgia 30223. I have not tried these plants personally, but they hold promise. Other gardens that have tried them are very excited about the possibilities.

Steven A. Frowine, Chairman of Indoor Horticulture

The Holidays ❦ The Holidays ❦ The Holidays

On Decking the Halls

At Christmas we put up trees, hang mistletoe, drape evergreen because this is the way of celebrating the holiday that has been passed on to us. In our highly rational era, we have forgotten most of the myth and superstition on which many of these traditions are based. But some are interesting and worth retelling at this time of the year.

There are several possible origins of the custom of decorating an evergreen as a **Christmas tree.** One, coming from eighth-century Germany, has it that on December 24 the Christian saint Boniface came upon worshippers who were sacrificing a boy to the god Thor under an oak. Boniface struck the oak once and it fell; he indicated a small evergreen nearby and told them to take that as a symbol of God, as a sign of endless life. Another story, also from Germany, credits Martin Luther with the introduction of the Christmas tree. On Christmas eve, he noticed stars through the branches of an evergreen. He brought the tree home and lit it with candles to symbolize Christ as the Light of the World. A third explanation for the custom is from eleventh century France, which attributes the origin of the Christmas tree to the *Paradise Play*, a miracle play performed in churches concerning Adam and Eve and their expulsion from the Garden of Eden. It was traditionally presented on Christmas Eve since the next day was the holiday for the birth of the Christ who would atone for the sin that caused their expulsion. The Garden of Eden was represented by a fir tree hung with apples and people began decorating trees in their own homes on December 24 in honor of Adam and Eve.

The **holly** that decks the halls in the song was initially hung to give elves and fairies somewhere to "hang in each leaf and cling to every bough" that they could participate in the festivities. Holly was specifically called for since the Druids believed it was a comfort to wood elves, being a sign that the world continued to live through the cold and snow of winter. The boughs were taken down by Candlemas (February 2) so that the spirits did not become too comfortable in the homes of men and decide to remain permanently. Holly was also thought to have special powers that assisted young women in finding husbands. On Christmas eve, a maiden placed three pails of water near her bed and pinned three leaves of green holly to her nightgown opposite her heart. The legend said that she was awakened by three yells from three bears, followed by three horse laughs. After this the form of her future husband appeared and moved the pails of water.

But the plant of the holidays most closely associated with love is **mistletoe**; the legends about it rise from it being a parasite that grows on trees. Since it remained green even when its host tree was barren in winter and since it appeared to have no roots, ancient Norsemen believed that it held the spirit of a god. In one of their myths the son of the goddess Frejya (a counterpart of Venus) was murdered by a dart made from a mistletoe branch. Because of this, she placed the plant under her custody and declared mistletoe a symbol of love. The Druids also accepted it as a magical plant since it grew on oaks, their sacred trees; enemies who met beneath a tree with mistletoe on it would lay down their arms and observe a truce for one day.

...Memberships

There are four reasons to give a Garden membership — winter, spring, summer, and fall — for the Garden is truly a special place for all seasons; a gift that lasts for all season. This year, you can give the people in your life — gardeners, photographers, friends, neighbors, business associates — something that you, yourself, enjoy. A gift membership is tax deductible for you and gives your friends free admission to the Garden, Shaw Arboretum, and Tower Grove House, invitations to special events, discounts at the plant and gift shops, and a year of the *Bulletin*. Regular Memberships are only $25, while a Contributing Membership, with guest privileges, is only $50. During the holiday season, you can save by giving more than one membership, as you receive a 10% discount when you buy two gift memberships, and 15% when you purchase three or more. For information, please contact the Membership Office at 577-5118.

A membership in Missouri Botanical Garden is recognized this month as a "Best Buy Gift" by *Consumer Reports*. Published by Consumers' Union of the United States, *Consumer Reports* is a magazine nationally recognized for its recommendations on the value of products and services; its circulation is 3 million. Each November the publication lists the items it considers to be of the highest value as presents for the holidays. For the first time ever in its annual listing it suggests memberships in botanical gardens as possible gifts, specifically recommending membership in Missouri Botanical Garden and the New York Botanical Garden.

...the Shops

The annual Holiday Preview Sale in the Garden Gate Shop is scheduled for Wednesday and Thursday, November 11 and 12, from 10 a.m. to 8 p.m. During the sale, Members receive a 15% discount on all merchandise in the shop, and a 20% discount on all items in the Holiday Gift Catalogue which Members will receive in the mail shortly. After the sale and through December 24, Members will receive a 15% discount on catalogue items. As in the past, refreshments will be served during the Preview Sale

A Holiday Plant Sale is scheduled for the Plant Shop for December 4-6 10 a.m. until 4:30 p.m. Garden Members receive a 20% discount on all merchandise during the sale Through December 31, Members wil receive a 20% discount on specific plants in the shop. Throughou December the shop will feature Christmas cactus, azaleas, camellias poinsettias and other traditional holiday plants. Special items prepared by the staff will also be available including holiday wreaths and decorated living Christmas trees. Two to three types of trees will be decorated including Norfolk pines. Refreshments will be served during the sale

...Tower Grove House

Tower Grove House will be decorated for the holidays and ready fo visitors on Tuesday, December 8 There will be natural green throughout the house and a tall evergreen tree in the north parlo decorated with authentic Victoria

The Holidays The Holidays The Holidays

ornaments. The antique finial for the tree top, a recent gift of Mrs. Hazel Knapp, is made of tin, with an angel, bells, and candles and will be used by Tower Grove House for the first time.

The tea room will have three Christmas luncheons, December 10, 15, and 17 with a delicious menu and special treats. The price will be $6.50. Space is limited to 40 each day and reservations are required-577-5150.

On Monday and Tuesday, December 28-29, Tower Grove House will offer a story-time for Pre-school and Kindergarten to Third grade children. The Pre-school children are invited for 11 a.m. and the Kindergarten to Third-grade children for 1 p.m. Admission will be 25¢ for children and 65¢ for adults. Groups are limited to 40 children; reservations are necessary. Please call 577-5150. Parents accompanying children may tour the house during the story time.

Another innovation this year will be the sale of hand crafted items made by the St. Louis Herb Society.

The house will be closed on Wednesday, December 30 to remove the decorations.

...12 Months Long

This year the Garden offers a unique opportunity for Members, and others, to purchase a 1982 wall calendar featuring stunning full-color photographs of the Garden by St. Louis photographer Jack Jennings. Jennings's work was displayed in an exhibit at the Garden this past May. His photos capture not only the features of the Garden, but its mood as well — the Drum Bridge through an early morning mist, Tower Grove House after a light snowfall, a field of daffodils reflected in the mirrored glass of the John S. Lehmann Building. The calendars may be purchased from the Garden Gate Shop or by mail order. Retail price is $6.95 (Members, $5.95.) Postage and handling is $1.00.

For Younger Members

Some Holiday Gifts Are "For the Birds"

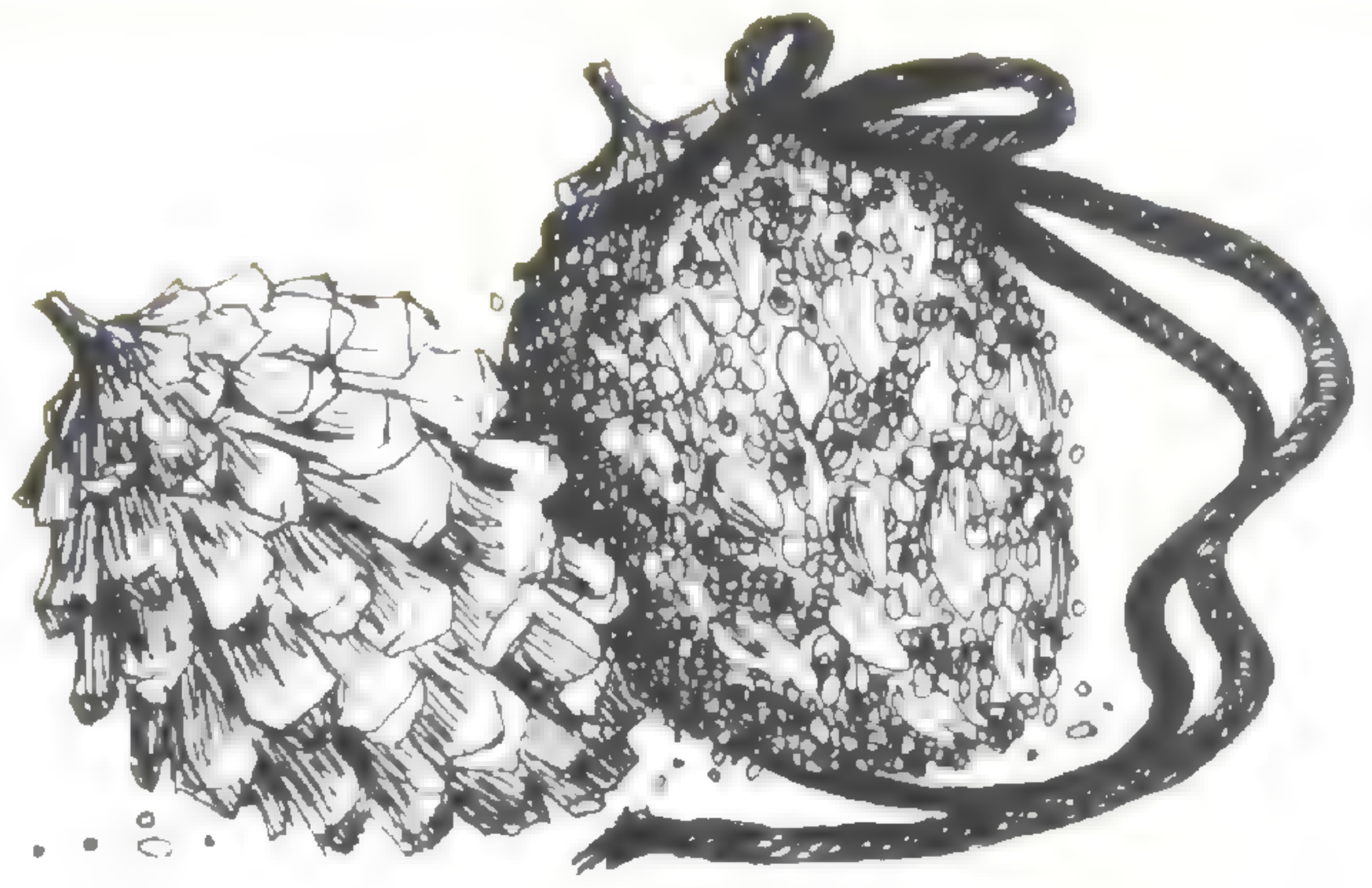
(ages 3-7)

Many of us collect pine cones well in advance of the holidays, anticipating using these delightfully durable products of nature in our holiday decorating schemes. This year, let the youngest members of your family help you collect a few extras. The children can then make special treat gifts for the birds, using the pine cone as a base. Here's how to do it:

Materials:

- 1 pine cone (for each treat)
- 1 jar of peanut butter
- wild bird seed mixture (available at grocery or feed stores)
- blunt knife
- yarn
- bird identification handbook, if possible

Procedure: Tie a length of yarn around the first row of scales at one end of the pine cone. Using a blunt knife, spread a layer of peanut butter around the entire pine cone. Dip the pine cone in the bird seed, and shake off any excess seeds. Take the bird treat outdoors and suspend it from a tree, shrub or fence. Try to have a bird identification book available so the children can find pictures and names of some of the birds who eat the treat. (*NOTE:* If peanut butter and seed are replenished often, the birds will learn to depend on the treat as a source of food during cold weather. With the return of warmer spring weather, the birds will no longer need their pine cone treats.)



Ilene Follman, Education Consultant

Corn Husk People

(ages 7-12)

Let's pretend for just a moment that we can't buy any toys. So, like the settler children, we will make them. The toys we will make are called "corn husk dolls." All you will need for the project is a pot of water, several corn husks, yarn, an empty soda bottle, and some natural materials to decorate your doll.

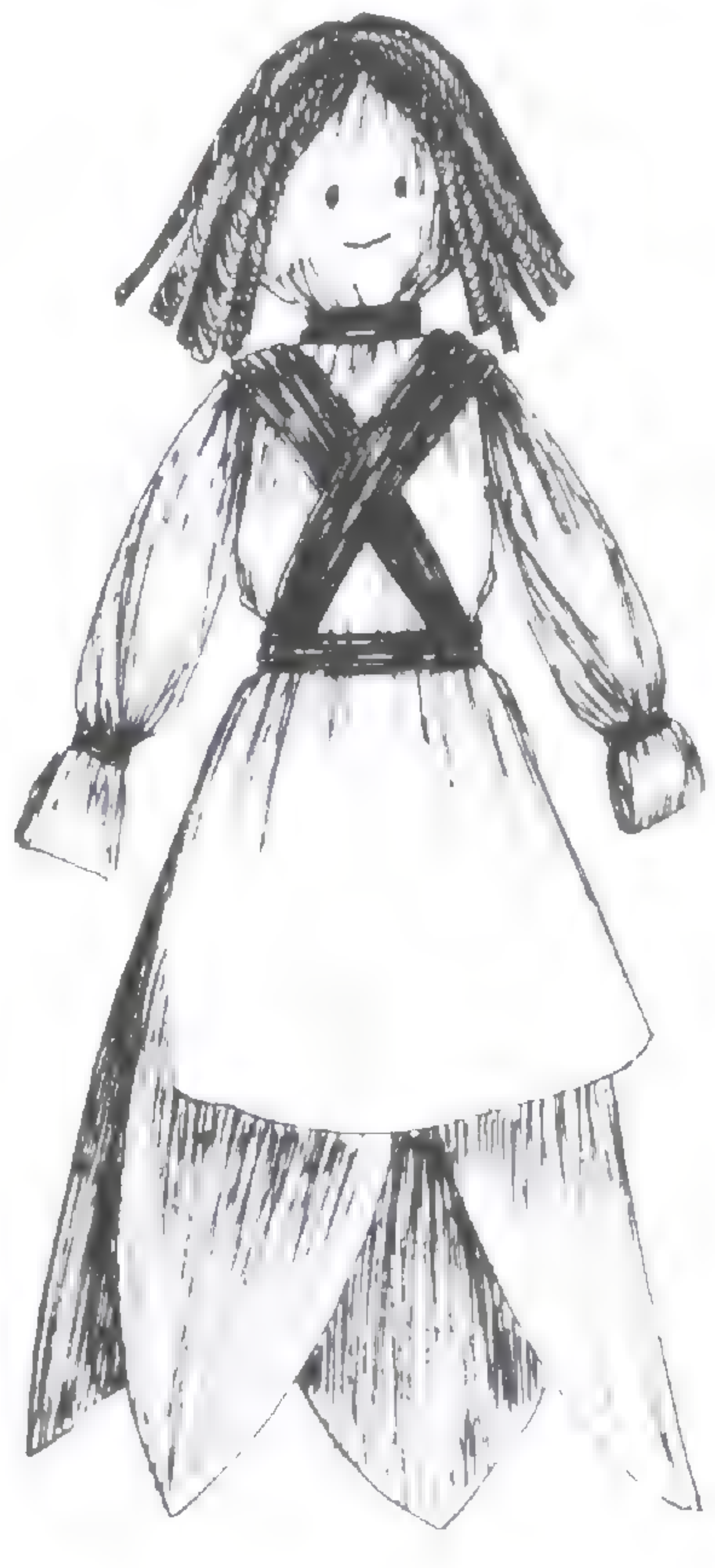
Begin by soaking several leaves from the husk in the pot of water. This makes them easier to work with. For the doll's body and neck, select a full husk with a stem on it. Set this husk over the soda bottle with the leaves pointing down. The soda bottle serves as a support for your doll. To give your doll shape, tie yarn around the husk where you think the doll's waist should be. Make the arms by taking two of the wet leaves and rolling them together. Bend them around the husk right below the stem. While holding them firmly in place, take a piece of yarn and wind it around the back and the front of the doll in an "x" shape.

For the doll's head, you need to roll several leaves into a ball. Then wrap a larger leaf over the ball. Set the head on top of the husk's stem and secure it in place by wrapping yarn around it. Yarn or corn silk will give your doll beautiful hair.

You can give your doll a touch of fashion by making an apron, shawl, pants, hat or shoes. You could make villages, pets, and plants out of corn husks or other natural material, like acorns, bark, twigs, leaves and stones.

Now that you've made your corn husk people, how did it feel to be a settler for an afternoon?

Ann Haley-Oliphant
Coordinator of Youth Programs



That Cup of Coffee

There is a story that an Arabian goatherd found his goats dancing one day. Fearing they were possessed, he followed them for a time until they came to a strange bush with red berries. He watched as they consumed the berries and resumed dancing. Tasting the berries himself, he felt moved to dance as well. An inman came upon the goatherd and dancing goats and was curious about the odd behavior. The goatherd showed the bush to the priest who tasted its berries also and joined the cavorting. Later, taking some of the berries to his monastery, he told his brothers what had happened and after they could not determine what the berries were nor why they caused such a reaction, they decided to pray. The inman fell asleep during the service and Mohammed appeared to him, telling him that the berries should be boiled in water and that the liquid should be drunk prior to praying to insure that the worshippers would remain awake.

The spiritually inspired drink was, of course, coffee. Today, far from being a handful of berries boiled before prayer, it is one of the world's most important natural commodities, second only to petroleum, with approximately fifteen million tons produced last year — accounting for $12 billion — and the livlihood of 25 million people dependent upon it.

Coffee (*Coffea arabica*) is native to Kenya and Abyssinia but the first record of it, aside from the legend of the goatherd and the inman, appears in Arabian medical books of the early tenth century. By the beginning of the sixteenth century, it was an integral part of Islamic culture — consumption of twenty cups per day by members of the upper class was common, and as part of his marriage vows, a Turk promissed that his wife would never be without it; failure to keep his promise was sufficient reason for divorce. The Arabs guarded their coffee jealously and permitted no fertile seeds or plants to leave the country; they did export roasted beans, however, and the drink was introduced into Europe in 1528. Because of its origin in an Islamic country, sixteenth-century Christians called it a drink of the infidels; an invention of the devil. Legend says that the pope, Clement VIII, hearing of the drink requested that a cup be brought to him for his inspection. The aroma was so pleasing that he tasted it and, enjoying it so much, said that it would be a shame to leave the infidels with exclusive use of it so he baptized it, making it permissible for Christians to drink it.

About 1690, Dutch traders succeeded in smuggling live coffee plants out of Arabia and establishing them in Java. The Dutch, like the Arabs, were careful to let no fertile plants out of their control, but did allow a few botanists to have single plants for study. One such botanist was Antoine de Jussieu, Royal Botanist of the Jardin des Plantes in Paris. The tree under his care, a gift by the Dutch to Louis XIV, was the progenitor of most of the coffee in Mexico, and the south and central Americas. That his specimen was so important in the history of commercial coffee production, however, was against de Jussieu's will.

A French naval officer, Gabriel Mathieu de Clieu, stationed in Martinique, suspected that coffee would thrive in the West Indies. In 1723, unable to obtain seeds of plants in any other way, he broke into de Jussieu's greenhouse and took a single coffee seedling. On the voyage to the New World, de Clieu's plant survived an attack by pirates, severe storms, and a water shortage during which de Clieu shared his small ration with the plant.

From Martinique, coffee eventually reached the South American mainland where it was cultivated by French and Dutch Guiana. Once more, the cultivators refused to allow other nations fertile plants and once more another nation — this time Brazil — succeeded in getting fertile plants through devious methods.

In 1727, the two Guiana's were involved in a border dispute that threatened to become war. Wishing to avoid this result, they requested that Brazil send an arbitrator to resolve the dispute. Brazil sent Francisco de Melo Palheta, a lieutenant colonel in its army, with the instructions to him to resolve the conflict quickly and return with coffee seeds. Palheta, diplomat enough to settle the border dispute but not enought to persuade either territory to give him the seeds, courted the wife of the governor of French Guiana. The day before his departure there was a banquet to honor his success at arbitration. There the governor's wife presented Palheta with a bouquet as a token. Concealed in the bonquet were fertile coffee seeds and seedlings. Palheta returned home, resigned his commission and began a coffee farm. By 1900, Brazil was producing 80% of the coffee in the world. Today, Brazil is still the largest producer but only grows about one third of the world's supply.

Almost all of the commercially grown coffee today is *Coffea arabica* and its several hundred varieties. *C. arabica* is an evergreen shrub that grows to about fifteen feet in height; its varieties can be trees from 30 to 60 feet high. It requires 40 to 70 inches of rain through the year and temperatures of between 55 and 80 degrees Farenheit. It grows almost exclusively on mountains. The trees bear fruit in three to four years after planting and are full-bearing in six to eight years. They are harvested by hand because the berries must be picked at a precise time; too early, and the flavor is not fully developed; too late, they become bitter. Each berry contains two beans; five to six pounds of berries result in one pound of clean coffee. There are approximately 1,000 dried seeds per pound.

After the beans are picked, they are cleaned and dried, then milled to remove the covering and skin on each bean. Then they are graded, weighed, and sorted. Inferior and discolored beans are discarded. The dried, green coffee beans are exported. They are roasted and packaged in the country that purchases them for consumption.

And consume them we do. Rough calculations indicate that last year the population of the world drank around 581.4 billion cups of coffee: Java, Colombian, Mocha, Brazilian Bourbon (many coffees are named for their place of origin), black, with cream and sugar, iced, espresso in a demitasse. There are coffee breaks (first held in English cotton mills during the Industrial Revolution), coffee klatches (originally a term coined by beer-drinking Germans (*kaffee klatsch*) to deride coffee as a "woman's drink), coffee houses (appearing first in Mecca around 1500), and coffee shops. There is "the autocrat of the breakfast table," those cups of coffee that get us going early and keep us running until lunch and keep some of us running all day (Voltaire reportedly drank 50 cups a day).

The primary reason most of us drink this non-nutritive beverage is its caffeine. Caffeine is a chemical that is one to one-and-one-half percent of the content of a coffee bean.

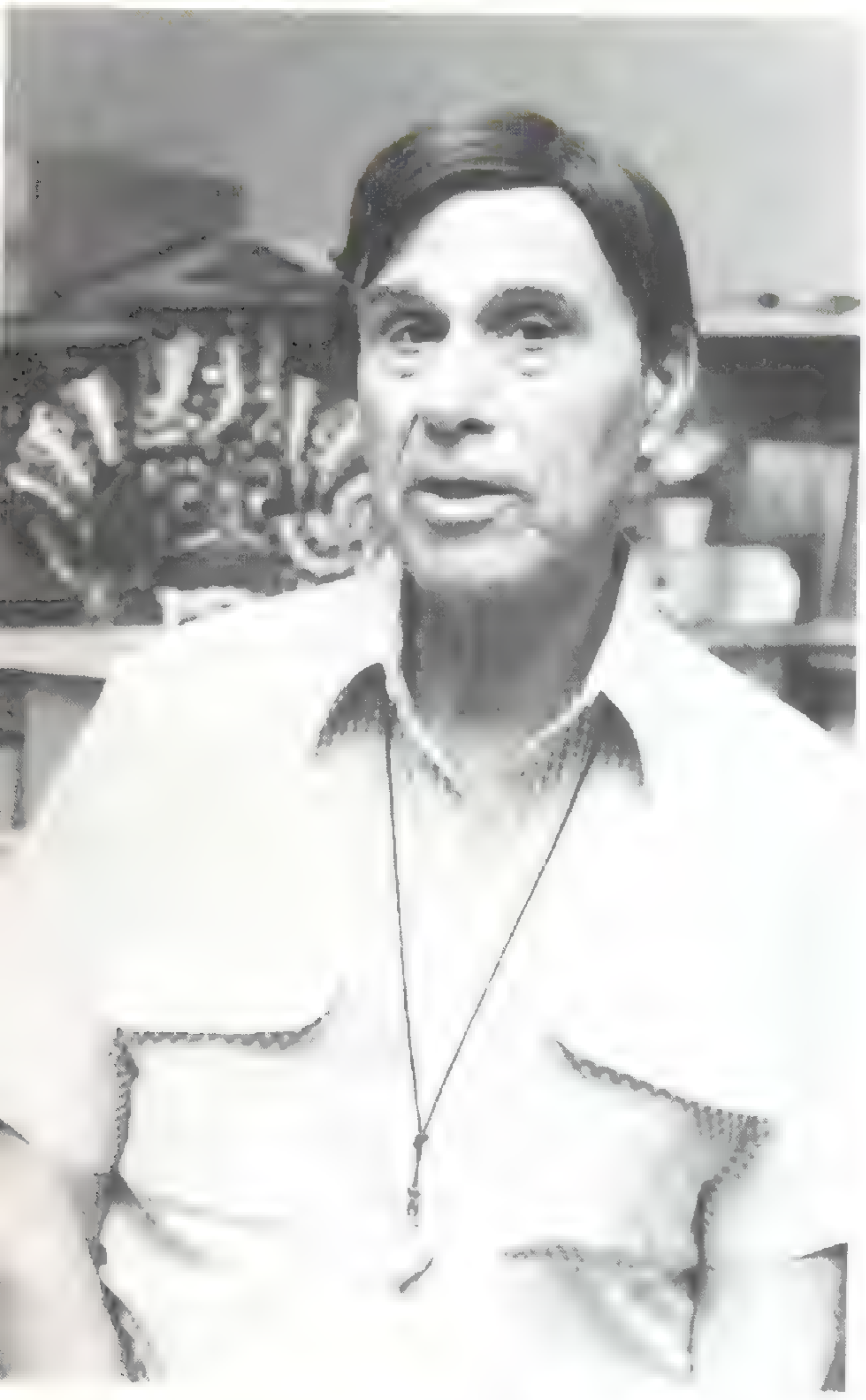
It affects our behavior actually by countering the affect of another chemical, adenosine, that naturally occurs in the brain. Adenosine inhibits the chemicals that carry nerve impulses through the brain by bonding to neurons. Caffeine prevents adenosine from bonding by bonding itself to the neurons. This allows the brain's impulses to fire more rapidly than normal.

Because caffeine sometimes causes nervousness and sleeplessness and because it has recently been suggested that caffeine may be linked to pancreatic cancer (though many doctors dispute this, claiming insufficient evidence), many people are drinking decaffeinated coffee. The caffeine is removed from unroasted coffee beans by soaking them in water, which swells their cells, then submerging them in a solution that flushes out approximately 97% of the caffeine in the beans. They then are washed and roasted.

Perhaps even a greater controversy among coffee drinkers than the possibility of caffeine as a carcinogen is the proper method of brewing a cup of coffee. (Never say "instant" to a connoisseur; one proprietor of a shop that specializes in coffee pointed to a book on coffee for sale in her shop and advised against using it as a reference source. "It's not very good," she said. "It gives recipes using instant coffee.") Most subscribe to the practice of using a drip method, (never boil it!) with freshly ground beans. Ground coffee, once the vacuum seal has been broken, loses its flavor within days if stored in a pantry, within a week if stored in a refrigerator; although it will last for up to two months if frozen. Unground coffee, however, can retain its flavor for six months if frozen in an airtight container. One coffee manufacturer suggests buying only enough coffee for a week, and grinding only enough for each use.

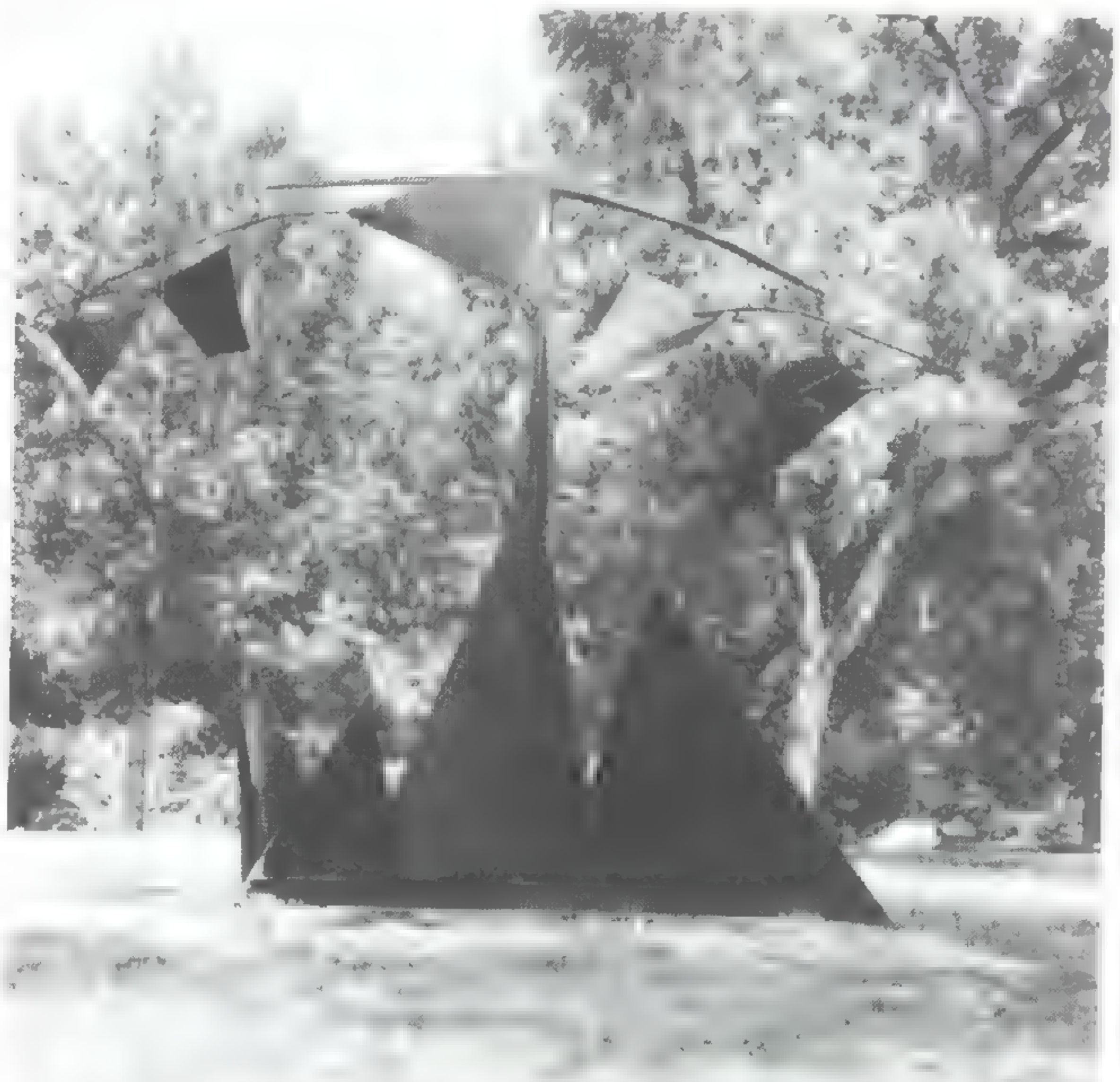
The primary ingredient for the elusive perfect cup is, of course, water, since coffee is 97% water. Most experts say that if the available tap water is pleasant to drink it will make a pleasant cup of coffee. Some purists, however, will use only bottled water.

Coffee will be featured as one of 65 plants in the Edible Plants Exhibit in the Climatron through November 29. The exhibit is part of the Garden's continuing effort to use its displays for education about the natural world. The Edible Plant Exhibit will be open from 10 a.m. until 4:30 p.m. and is partially sponsored by Dierberg's School of Cooking. As a part of the exhibit, the school will hold demonstrations on the use of tropical foods in recipes on Sunday, November 1, from 1 to 4 p.m. A booklet of tropical recipes, published by the Garden's Education Department, will be available for $1.

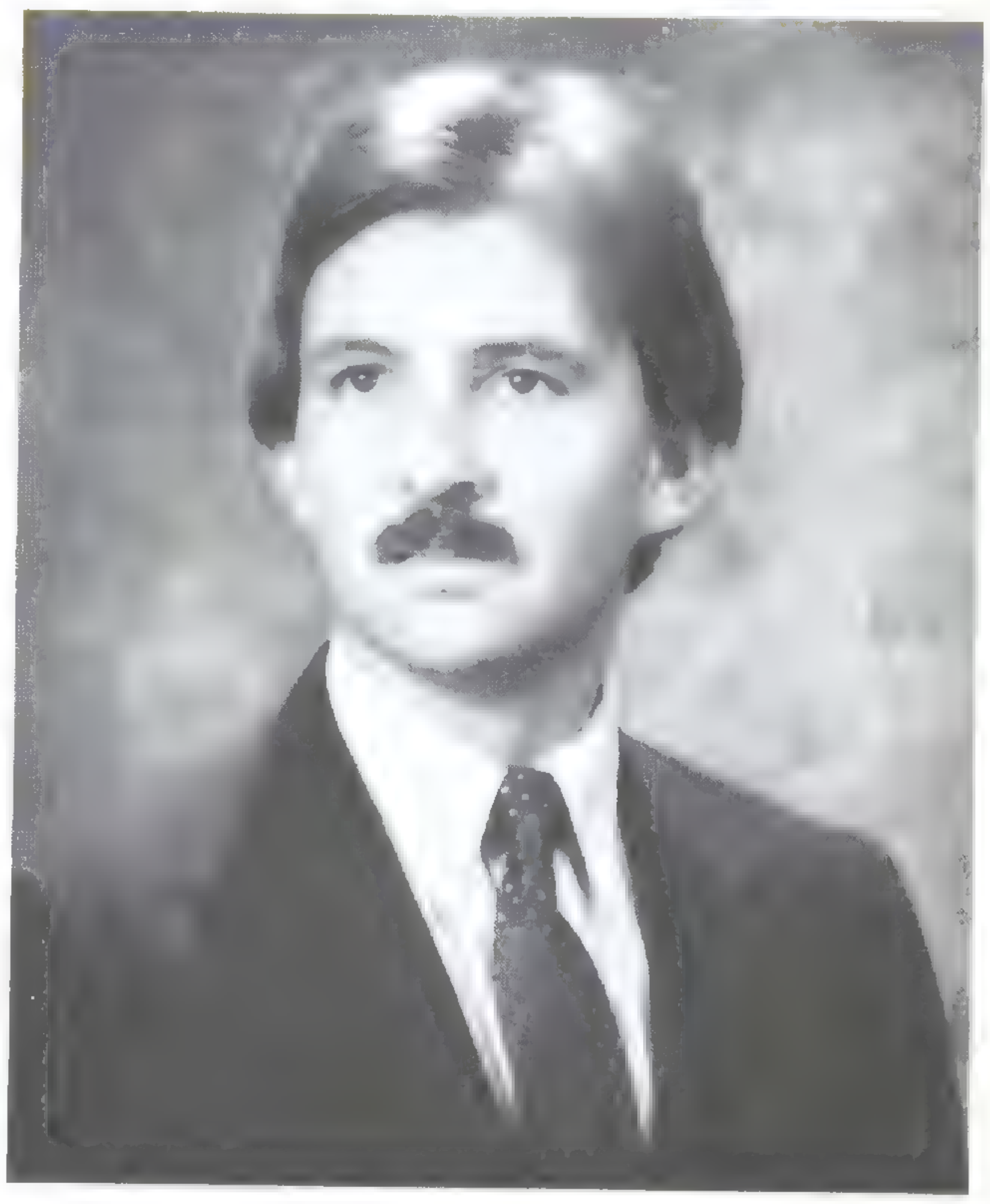


Dr. Julian K. Steyermark *visited here in mid-August to confer with Dr. Gerrit Davidse egarding the Garden's work in Venezuela. Dr. Steyermark, a graduate of the Garden's botany program through Washington University, is presently working on a* Flora of Venezuela. *Following the receipt of his doctorate, Steyermark was a member of the Garden staff and hen joined the department of botany at the Field Museum in Chicago. He is the author of* Spring Flora of Missouri, *published by the Garden, and the* Flora of Missouri. *Dr. Steyermark received the Garden's Henry Shaw Medal n 1979.*

Alexander Calder's *steel sculpture, "The Tree," was installed in the Garden in late summer. Located in a grove of walnuts near the Demonstration Vegetable Garden, "The Tree" is a black stabile-mobile and is 17-feet high. Its mobile element is 35-feet long. Alexander Calder (1898-1976) is perhaps the world's best known contemporary sculptor, and is one of the few artists in history who can lay claim to the creation of a new art form—in this case the mobile. "The Tree" is being loaned to the Garden by Mansion House Center Properties, Inc.*



The third edition of **Biology of Plants,** by Dr. Peter H. Raven, Dr. Ray F. Evert and Helena Curtis has been released recently by Worth Publishers of New York. Originally published in 1971, *Biology of Plants* is the best selling basic college botanical text. The latest edition is available in the Garden Gate Shop.



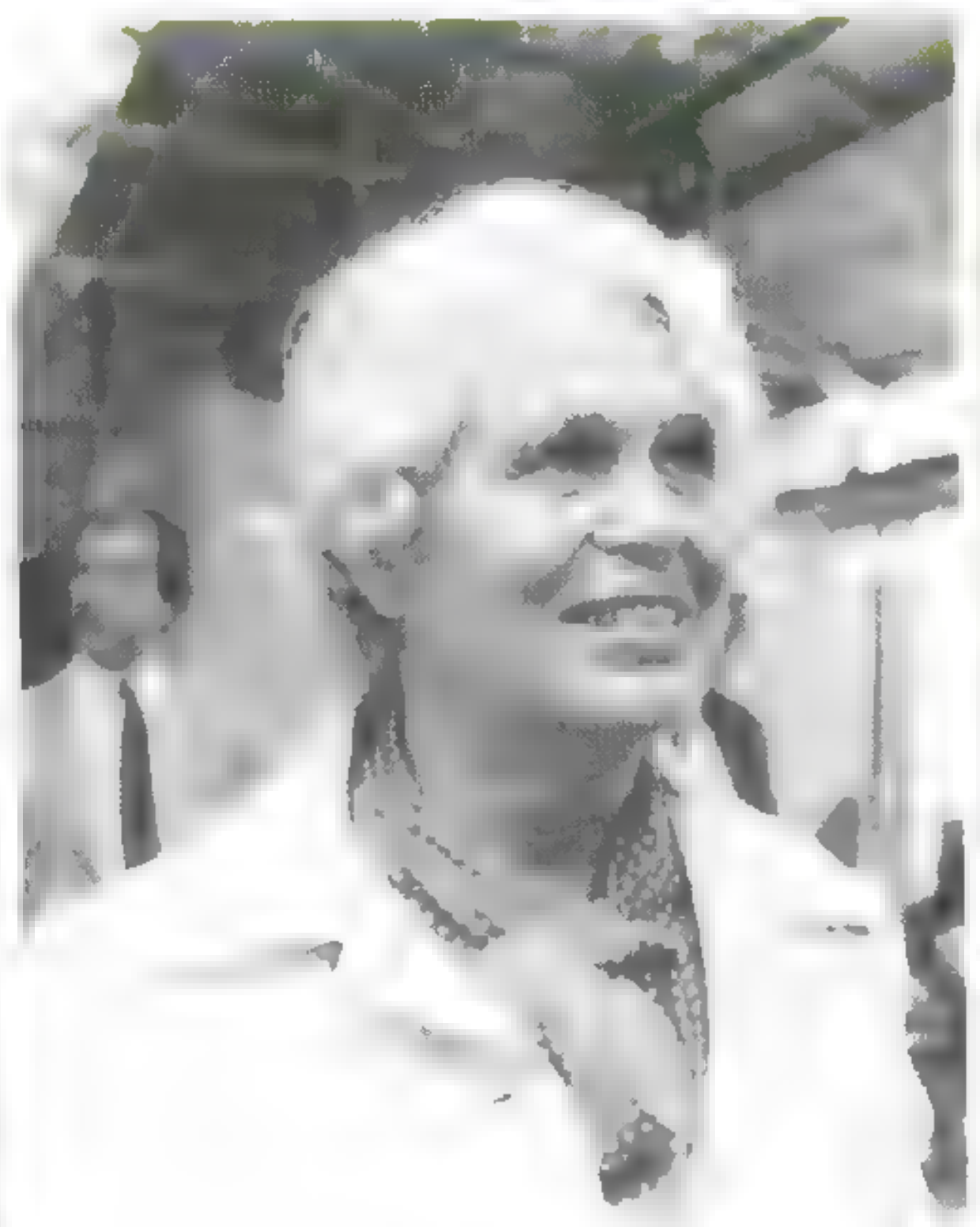
New Merchandise Manager

Missouri Botanical Garden has appointed Larry W. Reimelt as Merchandise Manager in charge of retail operations. Reimelt was prevously employed by Famous-Barr Company, most recently as stationery buyer. He is a graduate of the University of Kansas at Lawrence.

As Merchandise Manager, Reimelt will supervise the Garden Gate and Plant shops, as well as the Garden restaurant, the Greenery. All three retail operations will be expanded within the Visitor Center scheduled to open in April 1982.

New Trustees Elected

Robert E. Kresko



Marion K. Piper

Dr. Howard A. Schneiderman

Robert C. West

At its August 12 meeting the Board of Trustees of Missouri Botanical Garden elected four new members. Under the terms of the Amended Deed of Trust recently approved by the St. Louis Circuit Court, the Board is permitted to add additional trustees to serve terms of up to four years. Elected were Mr. Robert E. Kresko, Mrs. Marion K. Piper, Dr. Howard A. Schneiderman, and Mr. Robert C. West.

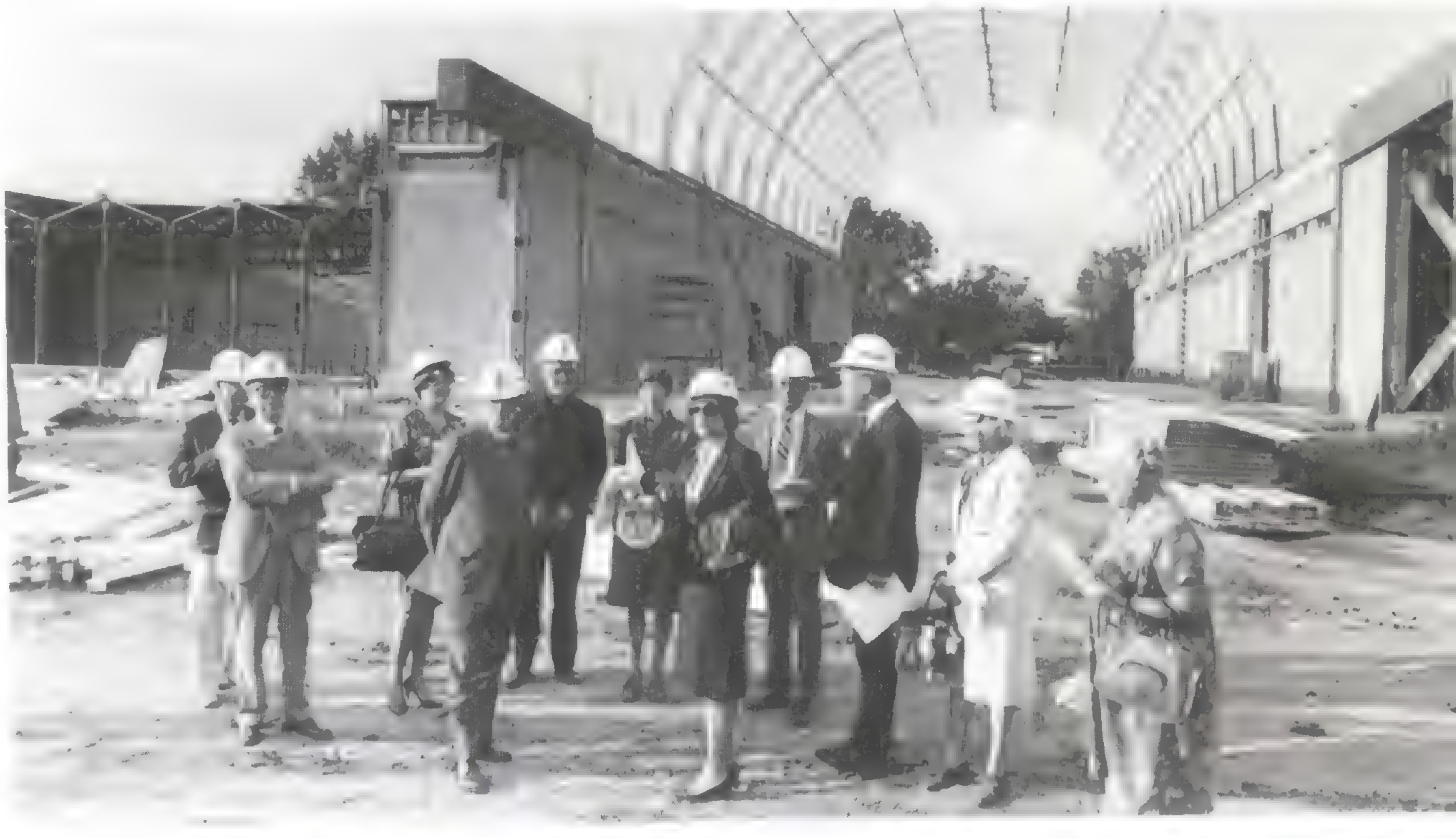
C. C. Johnson Spink, President of the Board, said, "We are fortunate to have them on the Board. They each bring unique talents and insights to the Garden, and the Garden can only gain from their contributions."

Robert Kresko is Senior Partner of the Trammel Crow Company, a real estate development corporation. A graduate of Brown University, he is a resident of Ladue. "I'm very honored and enthusiastic to be a member. All of us who have abilities to lend assistance to organizations like the Garden owe it to do so. I look forward to my association with it and toward making a meaningful contribution."

Marion Piper is a former instructor at the University of Missouri; she was also a member of the staff of the University of Illinois Extension Service for Agriculture. Originally from Highland, Illinois, she holds a master's degree from Teachers' College, Columbia University. "I have always been conscious of gardens being vital to any family's existence," she said. "I spent much time here with my own children and have always been interested in the Garden. It has a role as a pioneer in new developments in research. It also offers a valuable service for many people who have horticultural problems. I'm delighted to have the opportunity to work as a member of the Board."

Dr. Howard Schneiderman, Director of Research at Monsanto Company, is a much-honored scientist. Taking his Ph.D. in Psysiology from Harvard University, he has been on the faculties of the University of California-Irvine, and Case Western Reserve University in Cleveland, Ohio, and has published over 180 scientific books, articles, and papers. Talking about his reasons for accepting his appointment to the Board, Dr. Schneiderman said, "Quite apart from civic reasons, I have a very deep interest in the preservation of resources and genetic diversity. The Garden is a place where strategies for the future will be made; it's one of the world's most important institutions. Being a member of the Board will provide an opportunity for me to work with members of the community on matters that are important to the community and beyond it."

Robert C. West is Chairman and President of Sverdrup Corporation, a St. Louis based engineering firm, and was extremely active in developing that corporation. A graduate of the Georgia Institute of Technology, he has been involved on the boards of professional, civic and charitable organizations including the World Wildlife Fund, U.S., of which he was Vice Chairman in 1978-79, Goodwill Industries of America, and Webster College. He is also a Director of General Steel Industries, Inc.



At its September 16 meeting, the Garden's Board of Trustees toured the site of the Visitor Cente currently under construction and due to open in April of 1982. The Center will contain the Garden's educational facilities, an auditorium, and its restaurant and retail shops.

NEW MEMBERSHIPS
August & September 1981

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(continued on page 12)

Calendar

November

November 1-7

500 Years of Botanical Illustration, Lehmann Building, continues through November 30, 9 a.m.-5 p.m., Monday-Friday

North American Hand Papermaking Exhibit, Lehmann Building, continues through November 30, 9 a.m.-5 p.m., Monday-Friday

Edible Plants Exhibit, Climatron, continues through November 29, 10 a.m.-4:30 p.m.

Euphorbia Exhibit, Desert House, continues through November 14, 9 a.m.-4:30 p.m.

Lecture: "Explorations in Southern Africa," Lehmann Building, November 4, 10:30 a.m. & 8 p.m.

November 8-14

Garden Gate Shop Holiday Preview Sale, Garden Gate Shop, November 11-12, 10 a.m.-8 p.m.

Lecture: "The Future of Plant Exploration," Lehmann Building, November 11, 10:30 a.m. & 8 p.m.

Orchid Sale, Plant Shop, November 13 (Special preview — admission $5) and November 14 (no admission charge), 7-9 p.m. on 11/13, and 10 a.m.-4 p.m. on 11/14

500 Years of Botanical Illustration: Continues

North American Hand Papermaking Exhibit: Continues

Edible Plants Exhibit: Continues

Euphorbia Exhibit: Final day, November 14

November 15-21

500 Years of Botanical Illustration: Continues

North American Hand Papermaking Exhibit: Continues

Edible Plants Exhibit: Continues

November 22-30

500 Years of Botanical Illustration: Final day, November 30

North American Hand Papermaking Exhibit: Final day, November 30

Edible Plants Exhibit: Final day, November 29

December

December 1-5

Marbled and Decorated Papers Exhibit: Lehmann Building, Opens December 1, 9 a.m.-5 p.m., Monday-Friday (through December 30)

Holiday Plant Sale: Plant Shop, December 4-6, 10 a.m.-4:30 p.m.

Holiday Plant Exhibit: Climatron, Opens December 5, 10 a.m.-4:30 p.m. (through December 24)

ecember 6-12

Victorian Holiday: Tower Grove House, opens December 8, 10 a.m.-4 p.m. (through December 29)

Marbled and Decorated Papers Exhibit: Continues

Holiday Plant Exhibit: Continues

ecember 13-19

Marbled and Decorated Papers Exhibit: Continues

Holiday Plant Exhibit: Continues

Victorian Holiday: Continues

ecember 20-26

Marbled and Decorated Papers Exhibit: Continues

Holiday Plant Exhibit: Final day, December 24

Victorian Holiday: Continues

Christmas, December 25: Garden Closed

ecember 27-31

Marbled and Decorated Papers Exhibit: Final day, December 30

Victorian Holiday: Final day, December 29

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(continued from page 10)

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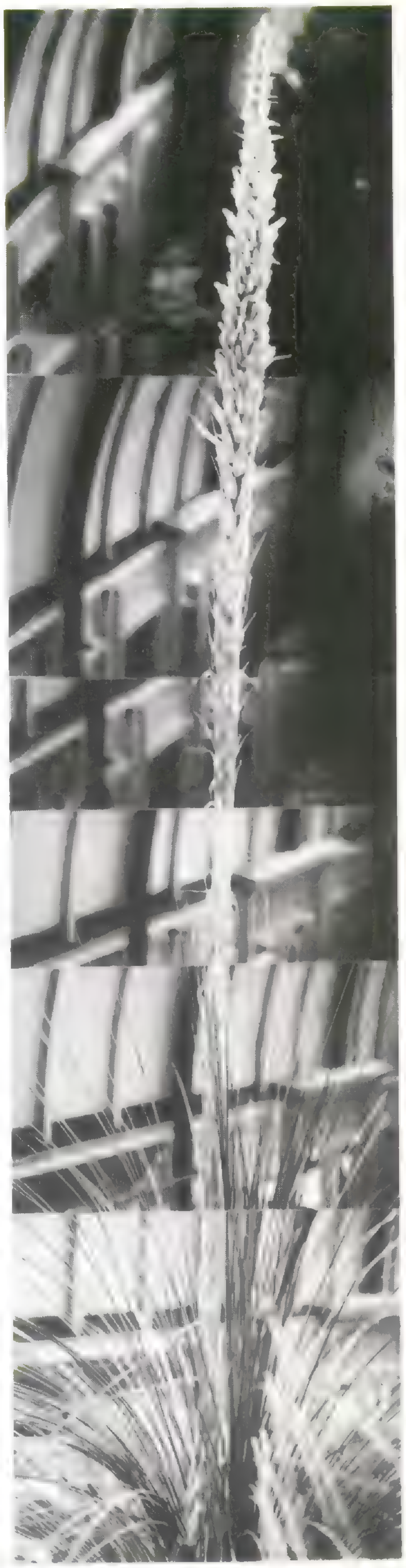

The Desert Spoon (Dasylirion quadrangulatum) *blooming in the Desert House in September. The plant is approximately 150 years old and was blooming for the first time. It was given to Missouri Botanical Garden by the Mexican government after the 1904 World's Fair*

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Translating Science

Science is hard work and kids don't want to work that hard. They have the notion that...science is something you can live without. —High school senior

This program was a great learning experience. It turned everything around for me. I thought that I—myself—couldn't do anything about the quality of the environment. Now I feel I can. The program opened my eyes.

—High school senior, 1981 ECO-ACT participant

During the past several decades, statistics "proving" how poor American science education is have proliferated. Students here have been unfavorably compared to science students in Japan and the Soviet Union. "The numbers are startling when compared with other advanced countries," reported Roger Rapoport in *Science 81*. "Five million Soviet high school students take calculus each year, but only 105,000 Americans do. Every Japanese high school graduate receives twice as many hours of instruction in science and math as do American students." Mr. Rapoport's article is unique in that, despite the numbers he cites, he finds reason for optimism. Most who report such figures follow them with predictions of doom and words like "failure." "We cannot hope to maintain our technological society with a generation who knows nothing about science," they say.

To complicate the problem, apparently pushing it in the direction of the expectations of the pessimists, the government has proposed—at this writing—cutting drastically the National Science Foundation's budget for science and engineering education.

In order to meet the challenge of producing, if not scientists, then science-educated persons in a time during which money for such programs is becoming increasingly scarce, institutions are beginning to develop innovative programs and to redirect their priorities. "We are giving more and more attention to teacher education programs," said Judy Studer, Chairman of the Garden's Education Department. "Of course, we will continue to educate students directly, but by educating their teachers we can have an impact that goes much further. If we educate one teacher, he or she will return to the classroom and in turn teach thirty or 100 different students."

One program recently developed by the Garden fills several needs at once by combining student-education with teacher education. Called ECO-ACT, the program educates high school students who in turn teach elementary school students. ECO-ACT was created in the summer of 1980 with funds from an anonymous donor. During August, 1981, 30 students from five high schools participated in an environmental education and leadership training program at the Garden. In the 1981-82 school year, these students are spending several hours a week in elementary classrooms.

"ECO-ACT" is an acronym; ECO from ecology, but also suggesting one of the goals of the program (echo) in that what the high school students learn is carried by them to elementary classrooms. ACT stands for Acting, Creating, Teaching, and the acronym itself again is an appropriate characterization of the focus of the program. "There were very few lectures," said David Wilson, coordinator of the program. "We did not spend much time in the classroom."

Students visited newspaper offices, sewage treatment plants, city planners, attorneys, labor officials, specialists in environmental quality and control. They camped for a week in the country, canoed on the Meramec, spent a day on a farm at which there was no running water.

Over Wilson's desk is a typed quotation from Aldous Huxley that perhaps best explains the program's bias in favor of experience over classroom lecture: "Our education is predominantly verbal and, therefore, fails to accomplish what it is supposed to do...The arts of being directly aware of given facts of our existence are almost ignored."

"Related to this notion is the importance of understanding the broad picture," Wilson said. "For example, the water cycle. You might have a student who can recite from memory a chemical reaction, but never has considered the fundamental way rain and the evaporation of water are related to our life. Waking up in the morning with dew on your sleeping bag helps you understand the cycle.

"When the students went on the canoe trip—and it

(continued on page 4)

Comment

With the beginning of this new year, it is a good time to thank those who helped us make 1981 the excellent and successful year that it was. Without the support and encouragement of you, our Members, our work during the past year would have been exceedingly difficult.

Those of you who volunteered to assist our staff—and the number of volunteers (413) was at its highest in our 122-year history—helped our education program serve 40,000 students. You taught classes and guided tour groups through the grounds and greenhouses. You helped our horticultural staff maintain and improve the 79 acres in St. Louis and the 2400 acres of Shaw Arboretum in Gray Summit. You helped in our herbarium, library, archives, and administrative departments.

By speaking well of us in the community and to your friends, you helped our attendance increase once again over the previous year; by the end of October we had already had more visitors than for all of 1980. By introducing your friends, families, and associates to the Garden and its Membership program, you were instrumental in raising our Membership from 12,000 at the end of 1980 to over 14,000 currently.

Through your generous contributions you enabled us to move forward with the construction of our Ridgway Center, which will open later this year. Through your persuasion, you permitted us to achieve passage in the state legislature of the bill that will permit us to ask the voters to establish a botanical garden subdistrict of the Zoo-Museum Tax District.

For your help in these areas, and in others I do not have the room to mention, I wish to thank you on behalf of myself, the staff, and the Board of Directors of Missouri Botanical Garden.

Peter H. Raven

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Bolivia

Current estimates have it that there are approximately 15,000 different plant species in Bolivia, a country about the size of Texas and California combined. By comparison, in all of the United States there is a total of 15,000 species. Bordering Peru and Brazil, the country has a population of over five million, almost half of which is under 15. Seventy percent of the population is employed in agriculture, growing crops of potatoes, sugar, and barley, and herding cattle, sheep, and llamas. "There are also a large number of root crops native there that are practically unknown here," said Dr. James Solomon. "One of my favorites is oca—*Oxalis tuberosa*—it's very sweet, if you allow it to sit in the sun five to six days after harvesting. It can be substituted for potatoes." Solomon was in St. Louis for several weeks in late fall. A member of the Garden's botany department, he is stationed in Bolivia as the holder of the William L. Brown Fellowship provided by Pioneer Hi-Bred International of Des Moines, Iowa. "There is a tremendous diversity there of natural vegetation and cultivated crops," he said. "For example, Bolivia has a great variety of corn. In the U.S., we have very few under cultivation—basically there is sweet corn, and field corn—used in animal feeds—and corn for popping. In Bolivia, they grow different strains of corn for different reasons. One has, for example, dark purple kernels. It's used for making *chicha morada,* a corn beer. There are others used specifically for soups, or breads. What's important about these different varieties is that they are like living seed banks. Extensive use of a few species or hybrids can deplete the world of important genetic diversity. If farmers stop planting this large variety, eventually some of the strains will cease to exist, and we will have lost any benefits they might have provided for us."

A similar threat to this diversity is posed by rapid destruction of the rich natural vegetation. "Like so many other tropical countries, social pressures are causing natural resources to be exploited without an adequate understanding of the complex interrelationships within these areas. We hope, with the cooperation of the Bolivian Academy of Sciences, to document what natural resources exist and begin to understand how they might be of benefit to man," Solomon said.

Despite the number and diversity of plant species in the country, until recently there has been little botanical exploration in Bolivia. Aside from Dr. Solomon, there is one other scientist working in Bolivia collecting plants and assisting in the development of a herbarium for the country. "We have an agreement with the Bolivian Academy of Sciences to do this. It is an excellent opportunity to increase our understanding of this poorly known country and to provide specimens for our own herbarium and for other scientists."

New Visitor's Center To Be Named for Ridgways

The new Education center at Missouri Botanical Garden, scheduled for dedication and opening to the public next summer will be named in honor of Louise G. and Edmund G. Ridgway, it was announced by C. C. Johnson Spink, president of the Garden's Board of Trustees.

"The Ridgway Center will carry the name of Louise and Edmund Ridgway in order to recognize the generous support of Elmer G. Kiefer and his wife, Mrs. Ernstine Ridgway Kiefer, daughter of Louise and Edmund Ridgway," Mr. Spink announced. The late Mr. Ridgway was a co-founder of The Seven-Up Company in St. Louis.

"The Ridgway Center represents the culmination of the Garden's Master Plan," Spink said, "which has been in progress since it was formulated in 1972. The building will provide Garden visitors with an outstanding educational and aesthetic resource. And it will provide the means by which the Garden can improve its already well-deserved reputation for public service."

"The Ridgway Center," Spink said, "has been a project supported by St. Louisans for St. Louisans. Its construction was made possible by contributions from private citizens and local organizations, foundations, the Kregge Foundation, and a Challenge Grant for the National Endowment for the Arts.

Contribution for Parking Lot

Thomas Dunne, President of Fred Weber, Inc., has provided materials for the new Visitor Center parking lot at a cost considerably below normal. This amounts to a substantial contribution to the Garden. We are grateful to Mr. Dunne for his generous support.

A visit to the Ridgway Center construction site will show the building taking its final form. Here workers install the translucent concourse roof in late fall.

New Year of Trees

This holiday, *Tu Bishevat* (meaning the 15th day of the month Shevat, and falling this year on February 8) is one of four days which mark a new year in the Jewish calendar—essential for establishing important civil, political, and religious regulations connected with agricultural produce. The new year for trees roughly coincides with the end of the rainy season in Israel.

In Israel today, this holiday is celebrated as Jewish Arbor Day and has great significance as a symbol of the redemption of the land through the conquest of the desert. On this day, thousands of young trees are planted in ceremonies throughout Israel by young school children.

From January 30 through February 21, the Garden will feature an exhibit for *Tu Bishevat.* Including barley, fig, acacia, and cypress, the exhibit will contain 15 trees and will be held in the Mediterranean House. Hours are 9 a.m. to 4:30 p.m.

Translating Science

(continued from page 1)

was the first time for most of them—they got a first-hand feel for the river. So when they are in the classroom and the subject of flood plains comes up—or rivers—or they read about succession and the trees that grow along a river, it's no longer abstract. They have experienced them."

Malcom Burns, a program participant from Vashon High School, was impressed by these experiences." I have always lived in the city. It was a great learning experience, especially my exposure to the rural environment. I learned how nettles felt; what poison ivy looked like."

Michelle Kollmar, from University City High School agreed. "I can see things with more depth. When you run water, it's not just tap water—you know where it came from."

But the students learned more from their month than how to canoe and the basics of the water cycle. "They learned much on several different levels," Wilson said. "We discussed and experimented with some of the latest research on air pollution and toxic chemicals. Often what is being taught in schools is several years behind the current research. The world of science changes so rapidly now; we wanted to provide assistance and resources to teachers on the most current research by bringing technical expertise from the university, from engineers and architects."

After hearing a lecture on the subject, the students potted spiderworts (*Tradescantia*). They will place them in selected locations—along busy highways, in places the students considered to be very clean, and in others they consider dirty. "Scientists are working with the spiderwort as a monitor of radiation and pollution levels," said Wilson. "Our doing this with the students is one example of what we mean when we say we are bringing current research into the classroom.

"This is important because we are facing a time of environmental crisis in the city and world-wide. It is young people who will affect policies in the future. We wanted to give them information as well as leadership skills."

Carolyn Wilson, from Southwest High, commented on that. "ECO-ACT is the future world of youth who are concerned about the environment. We are trying in our own way to improve the environment."

Robert R. Hermann, *a member of the Garden's Board of Trustees, was honored with the 1981 St. Louis Award for his leadership in the creation of the first V.P. Fair. The award was established in 1931 by the late David P. Wohl and is presented annually to an individual who has made the most outstanding contribution to the St. Louis area during the previous year. Presenting the award to Mr. Hermann is William H. Danforth, chancellor of Washington University.*

Dave Wilson pointed to another benefit of the program; one apart from the exploration, the lectures, and experiments. "One of the benefits of having the students spend the entire month together was that they were able to discover different patterns of behavior among themselves. Not only racial, but religious and social. During the week of camping, one evening the students were sitting around the campfire and they began to discuss religion. Most of them learned for the first time what the differences were between religions. Some didn't know before then that there *were* differences."

"One of the high points of the summer was the chance to share with kids from other schools. It will be neat for grade schoolers to have that chance," said Michele Kollmar.

Because of the program's unique design and because it brings together students from city and county schools (Southwest, Vashon, Clayton, University City, and St. Louis University high schools) ECO-ACT is recognized as a model for programs which advance the voluntary integration effort in St. Louis.

Taking what they had learned since the beginning of August, the students developed activities that they are now directing for elementary school children. One exercise, entitled "School Yard Ecology" was devised to increase the children's awareness of their environment through their exploration of the school yard. Another, called "Web of Life," was intended to demonstrate the interdependence of all components of the life cycle. "Our objective in teaching is to get the grade school kids to look at their surrounding in a new and more sensitive way than they have previously," said Rob Wood, a St. Louis University High School senior.

Through the first week of November, the thirty high school students had worked with 213 elementary school children. "A ratio of seven school children reached for each of the high school students we worked with," said Judy Studer. "In only the first two months of their teaching. This is what I mean when I talk about the effectiveness of educating people who will teach others."

Gardening in St. Louis

Coldframes & Hotbeds

The only difference between a coldframe and a hotbed is that the latter is heated (usually with electric cables). Both of these structures have many uses for gardeners.

Coldframes can be used to:

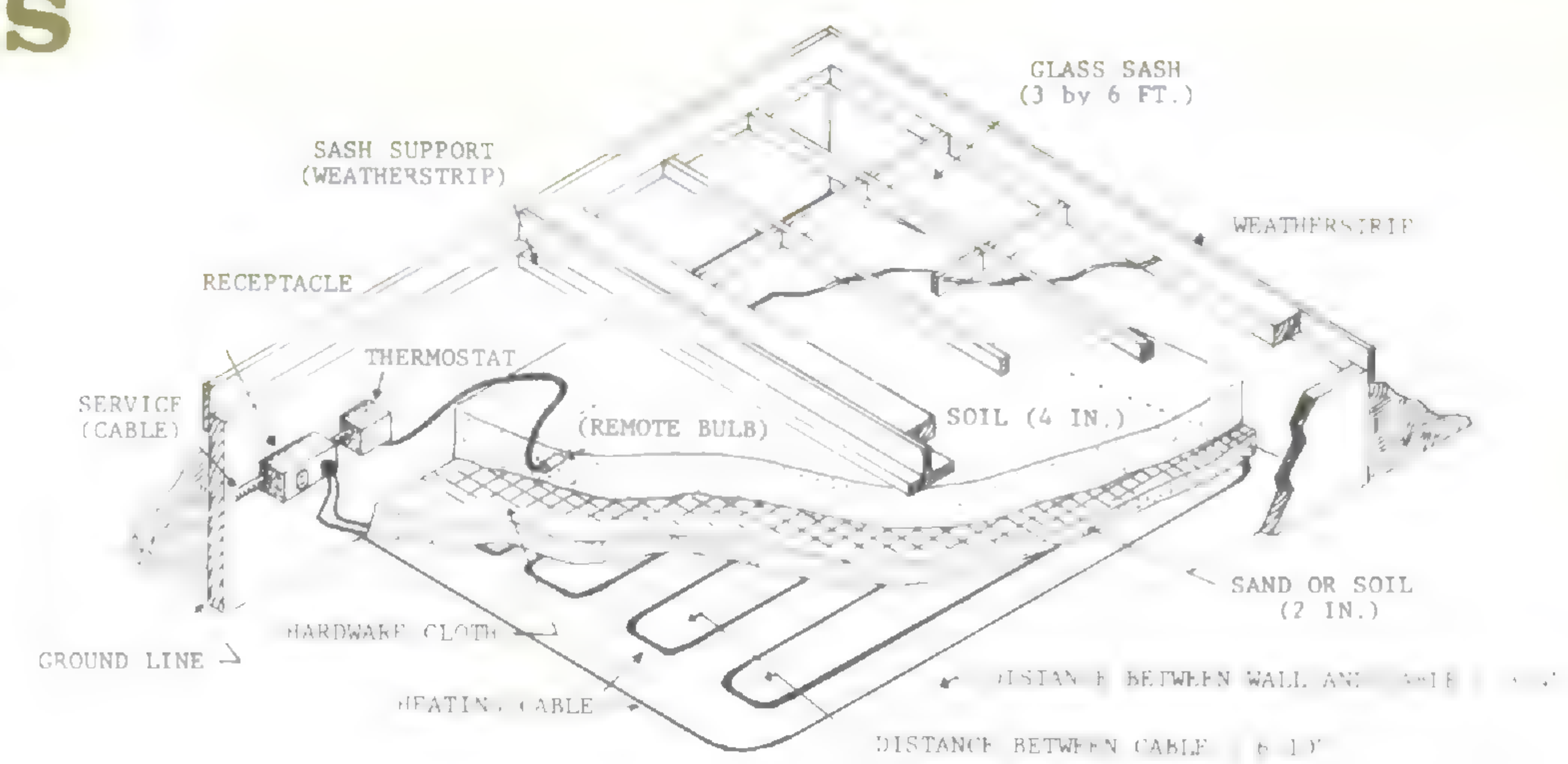
1. Start cool crops such as lettuce, onions, broccoli, spinach, and cabbage six to eight weeks before they can normally be placed outdoors.
2. Grow these same plants later in the fall.
3. Overwinter tender plants such as seedlings of perennials and biennials.
4. Overwinter bonsai plants.
5. Store vegetables. To do this remove 18 inches of soil. Then place root crops such as turnips, rutabagas, beets, carrots, onions, celery on 2-inch layer of straw. Cover with another layer of straw.
6. "Harden off" seedlings grown indoors. The coldframe acclimates them to outdoor temperatures and humidity.
7. Summer-over houseplants. Shade the frame with snow fencing or cheese cloth to cut down on light intensity and to protect the houseplants from wind, hail, and rain damage.
8. Store spring bulbs to be forced indoors or in a greenhouse.
9. Root hardwood cuttings.

Hotbeds can be used for the same purpose as a coldframe with the added possibilities for growing winter vegetables (dwarf varieties are recommended), forcing spring bulbs, growing cool-loving pot plants such as cineraria, calceolaria, primroses, azaleas, stock and pansies to maturity and for sowing seeds in early spring (annuals, vegetables, and perennials).

Coldframes can be constructed of wood (1/2″ thick) or cinderblocks. If you use wood, be sure to treat it with a wood preservative called Cuprinol. All other preservatives are poisonous to plants.

Coldframe covers or sashes may be constructed of:

Glass (old storm windows or doors)—advantages: cheap (if not purchased new), clear (will not discolor from sunlight)—disadvantages: inflexible, can break, expensive to replace, heavy.



Plastic—advantage: light weight, cheap, flexible sizes, easy to replace—disadvantages: will rip, will sag, discolors in presence of sunlight, less light transmission than glass.

Fiberglass (should be coated with Tedlar)—advantages: will not sag, easy to cut to size—disadvantages: less light transmission than glass, will eventually discolor due to exposure to sunlight.

Heating: hotbeds used to be heated by a 24-36 inch layer of fresh manure. This method was not very dependable since heat from this fermenting manure was not steady and it was usually totally diminished by early spring.

Most gardeners today use heavy-duty heating cables which are placed beneath the soil in the frame. It is most important to purchase heavy duty cable which is capable of providing 16 watts per foot. This cable can by vinyl jacketed or lead armored.

Management: it is important that the coldframe be properly ventilated. When sunlight strikes the frame it heats quickly. You can use a block of wood (1 inch by 4 inches by 6 inches) to provide three different heights to elevate the frame sash. If you want an automatic ventilation system, try the new solarvents which do not require electricity.

On cold nights, it is important to cover the coldframe with a blanket to prevent excessive heat loss. Double pane glass or a double layer of plastic with a 1 inch air space, will also greatly help retain heat.

Water plants in the morning so they will have time to dry before evening. Keep soil moist since damp soil retains heat much better than dry soil.

Steven A. Frowine, Chairman of Indoor Horticulture

For Younger Members

Pocket Gardening

(ages 4-7)

Have winter doldrums beset your household? Are your younger children yearning for warmer days of spring and summer? January and February, the cruelest winter months, can be brightened with a simple project that will delight the youngest family members. For a bit of spring in January, here's how to create a "pocket garden:"

Materials: one or two lima or mung bean seeds (mung beans are available at grocery or health food stores), square of thick paper towel, small plastic bag (sandwich size), and water.

Procedure: Show your child the seeds. Perhaps he or she has planted seeds before, cared for seeds, or watched seeds grow. If not, an even more special treat is in store. Cut a square of paper towel in half. Fold the half-towel in half again. Place the seeds in the center of the folded towel. Fold the towel ends over the seeds so that the seeds are completely enclosed in a small package. Dampen the seed package with water, until the paper towel is quite wet. Wring out the excess water. Place the seed package into the small plastic bag.

Your child is now ready to place the entire package into a convenient dress or pants pocket. The "pocket garden" can travel with him wherever he goes. Encourage him to remove the pocket garden each day to see if the seeds have changed. The paper towel can be dampened again if necessary. Within a few days to a week the seeds will germinate.

Ilene Follman, Educational Consultant

Chinese Trees

When Alan Godlewski, the Chairman of Landscape Horticulture, returned from his two-month tour of the Peoples Republic of China, he brought with him several species of hardy plants that are common to that country but rare or non-existent in our own. These will be introduced into the Garden over the next few months. Sitting with us outdoors in the Garden on one of the warmer days of late fall, he described some of the interesting species that will be cultivated here.

Poplar

My favorite of the hardy plants I saw—and brought back—is *Populus tomentosa.* It's virtually unknown in the U.S. but used extensively in Beijing as a street tree. The foliage is very striking. On the upper side it is dark green and shiny, as though it has been polished. The underside is dull and appears silver; it is covered with fine tomenta (hairs). The petiole is flat, which causes the leaves to quake in the wind similar to a quaking aspen; the sound is like a rushing river in a mountain. The tree is fast growing—about two to three feet per year. There is one difficulty in cultivating—it's reproductive pattern is problematic. The seeds have short viability, only three or four weeks. By comparison, oak seeds are viable for several months and maple seeds, if stored under proper conditions, are viable for several years.

Hackberry

There are native hackberries already in the Garden—*Celtis occidentalis*—located west of the Lehmann Rose Garden. These differ from the Chinese hackberry *(C. bungeana)* in leaf and fruit characteristics. Our native hackberry has dull green leaves and fruit that is green when young and black when it is ripe. It is susceptible to a viral disease called witches broom which causes severe distortion of the branch ends. The leaves of *C. bungeana* are a bright shiny green; the fruit is yellow when it is young and blackens as it ripens. *C. bungeana* reaches 40 to 45 feet in height when mature and has a large canopy of comparable size. It is also reputed to be immune to witches brooming. I believe it will prove a very nice tree for a large-scale setting; a park, for example.

I also brought with me *C. koraiensis,* the largest-leaved Celtis. It's leaves are a nice light green and turn a light yellow in fall. It is more upright than *C. bungeana.*

Persimmons

The persimmon is a member of the ebony family and as one might guess has very hard wood. There are several interesting Chinese species of Persimmon or *Diospyros* (from the Greek meaning grain of Jove which refers to the edible fruit.)

Diospyros rhombifolia is a diminutive tree—about six to eight feet tall. Its fruit is orange and persists until ripe which is after the leaves fall making it very ornamental. The other is *Diosphyros kaki* (with fruit the size of an apple) which is the large fruited persimmon one finds in the market. Selective breeding and growing has led to a number of cultivars which are hardy in Beijing. Two types are commonly grown—one is astringent, the fruit of which must ripen until soft before it is edible. The other is a non-astringent type which may be eaten as soon as it turns orange; hence, it is crunchy. We will attempt to introduce these two varieties for testing here in St. Louis by grafting them on rootstock of our native persimmon *Diosphyros virginiana.*

Alan Godlewski's visit to the Peoples Republic of China was sponsored by the Garden's sister botanical institution, The Nanjing Botanical Garden. His trip was part of the continuing exchange by the Garden for the advancement of knowledge and intercultural understanding. As space permits in future Bulletins, *we will publish further descriptions of plant species brought from China by Mr. Godlewski.*

Orchids: More than a corsage

Some sources claim that Orchidaceae is the largest plant family, with estimates of its size ranging from 500 to 600 genera and 20,000 to 35,000 species. Other sources rank the family as second, behind Compositae (sunflower family).

The orchid family includes between seven and ten percent of all flowering plant species.

They are found in tropics, subtropics, alpine meadows, deserts and bogs. In Central and South America there are approximately 8,266 species, with perhaps 1,200 in Panama alone. (Panama is about one-half the size of Missouri. There are approximately 32 species of orchid in Missouri.)

Most orchids in tropical areas are epiphitic, while those of temperate regions are terrestrial.

Orchid flowers range from 1/16 inch to more than one-foot. The longest orchid plant is *Vanilla,* which is a vine. The most massive are *Grammatophylum speciosum* (Queen of Orchids) and *G. papuanum,* which have thick trunks up to 16 feet tall. Another species, *Platyotele jungermannioides* grows to only about 5/16 inch high.

Of all the hundreds of orchid genera, only one has economic importance—aside from those of horticultural value—and that is *Vanilla.*

This is not to say that orchids in horticulture are any small business. Each year, the two largest growers of Cattleya orchids in the United States sell a combined total of 800,000 to 1,000,000 flowers to floral wholesalers.

In the 1980 catalogs of one of the largest orchid growers, prices ranged from $6 for a Dendrobium to $5,000 for a Sophrolaeliacattleya.

Many terrestrial orchids have tuberous roots that contain a nutritious starch-like substance, called Bassorin and also known as Salep, that was used to make a beverage that was popular in London before coffee was introduced there. It was so nutritious that it was a standard part of a ship's stores during the era of exploration by sea vessel. If provisions ran short, one ounce of Salep dissolved in two quarts of boiling water was considered sufficient nutrition for each man for one day. Salep was also used medicinally for gastric disorders.

The Garden's orchid collection represents approximately 135 genera and 950 species and includes almost 10,000 mature plants and seedlings. It is one of the finest collections of orchids in the United States. From February 6 through March 7, the orchid collection will be featured in the Annual Orchid Exhibit in the Climatron. The hours are 10 a.m. until 4:30 p.m.

Garden Honors Busch, Krukoff at 1981 Henry Shaw Banquet

August A. Busch, Jr. and botanist B. A. Krukoff were honored at the 1981 Henry Shaw Associates Banquet held on November 19 at the St. Louis Club. Missouri Governor Christopher S. Bond was the featured speaker.

Mr. Busch received the Albert P. and Blanche Y. Greensfelder Medal, an award established in 1980 to honor persons who have made contributions to landscape, garden and park planning, and designing for urban improvements.

In the 1950s, Mr. Busch opened a portion of his family's estate to the public. Known as "Grant's Farm," it includes much of the land farmed by Ullyses S. Grant prior to the Civil War.

Besides being a popular area tourist attraction, Grant's Farm also includes the Busch Wildlife Area, which was established by Mr. Busch as a preserve for animals that are endangered species or are uncommon in the St. Louis area. The preserve makes it possible for visitors to see animals they would not ordinarily see in this area. It serves a purpose similar to that of the Garden, in that visitors can experience the flora of the world within the Garden grounds.

Dr. Krukoff received the Henry Shaw Medal, established in 1933, in recognition of his pioneering botanical exploration of the Amazon River Basin in Brazil and his encouragement of the Garden's own botanical exploration. Born in Russia in 1898, he immigrated to the United States during the Russian revolution. In 1928 he made the first of eight botanical expeditions to Brazil; those expeditions resulted in the discovery of more than 200 new species of trees and shrubs, many subsequently named for Dr. Krukoff.

During recent years, he has encouraged the Garden's botanical work, especially the exploration of Nicaragua and South Africa. The Garden's B. A. Krukoff Curatorship for African Botany is named for him and currently is held by Dr. Peter Goldblatt.

Dr. Karl Folkers, a long-time associate of Dr. Krukoff's and the chemist who first synthesized Vitamin B_{12}, introduced Dr. Krukoff to the Henry Shaw Associates.

In his remarks, Governor Bond cited the importance of the Garden as an institution and as a cultural asset for the state of Missouri.

Also speaking were St. Louis Major Vincent Schoemehl, Congressman Robert Young, and C. C. Johnson Spink, President of the Garden's Board of Trustees.

Left: *at the Henry Shaw Banquet are (L to R) the Honorable Christopher S. Bond, Mr. and Mrs. Frederick M. Robinson, and Mr. and Mrs. Whitney R. Harris.* **Center:** *August A. Busch, Jr.* **Right:** *C. C. Johnson Spink with B. A. Krukoff.*

Donald W. Williams *Ex-Officio* Trustee

Donald W. Williams, elected President of the St. Louis Board of Eduation on October 13, has joined the Board of Trustees of Missouri Botancal Garden. Under the terms of the will of Henry Shaw, founder of the 122-year-old Garden, the President of the St. Louis school board automatically becomes a trustee of the Garden by virtue of his office.

"Historically, there has been an excellent relationship between the Garden and the St. Louis public schools, one that has been extremely beneficial to the schools," Williams said. "The Garden is one of the cultural institutions that makes St. Louis a fine place to live. It contributes enormously to the quality of life and I look forward to having this opportunity to work with the Garden."

Don Niederlander Dies

The library has been saddened by the recent death of Donald R. Niederlander, who served as a volunteer in the library's bindery. During Don's ten years of service to the Garden, he donated more than 9400 hours of his time, helping to preserve and restore hundreds of important books in the Garden's library. Don particularly enjoyed working on large sets of publications, and one can enter almost any aisle of the library's shelves and find examples of his work, a permanent memorial to his dedication to his craft and to the Garden.

Annual Systematics Symposium

The twenty-eighth Annual Systematics, held on October 16 and 17, 1981, was attended by nearly 300 biologists and graduate students. Begun as a midwestern meeting, in recent years the Symposium has become of national and international interest, attracting both speakers and participants from all over the United States as well as several foreign countries. The Symposium has been partially supported by a grant from the National Science Foundation for all except the first year of its history.

The subject of this year's Symposium was "Biological Studies in Central America," selected because of the general interest in this topic and because of the Garden's recently initiated cooperative program, Flora Mesoamericana, which is being conducted jointly with the Universidad Nacional Autónoma de México and the British Museum (Natural History). Participants were given a broad overview of the geology, flora, and fauna of Central America.

Many of those attending the two-day event came early and/or stayed late in order to use the research facilities of the Garden's herbarium and library. *Marshall R. Crosby, Director of Research*

Speakers at the 28th Annual Systematics Symposium were (L to R): Mario Sousa S., Universidad Nacional Autonoma de México; Jay M. Savage, University of Southern California; Gerrit Davidse and Alwyn Gentry both of Missouri Botanical Garden; Peter J. Coney, University of Arizona; Christopher J. Humphries, British Museum (Natural History); Luis Diego Gomez, Museo Nacional, Costa Rica; and W. A. Clemens, University of California-Berkley.

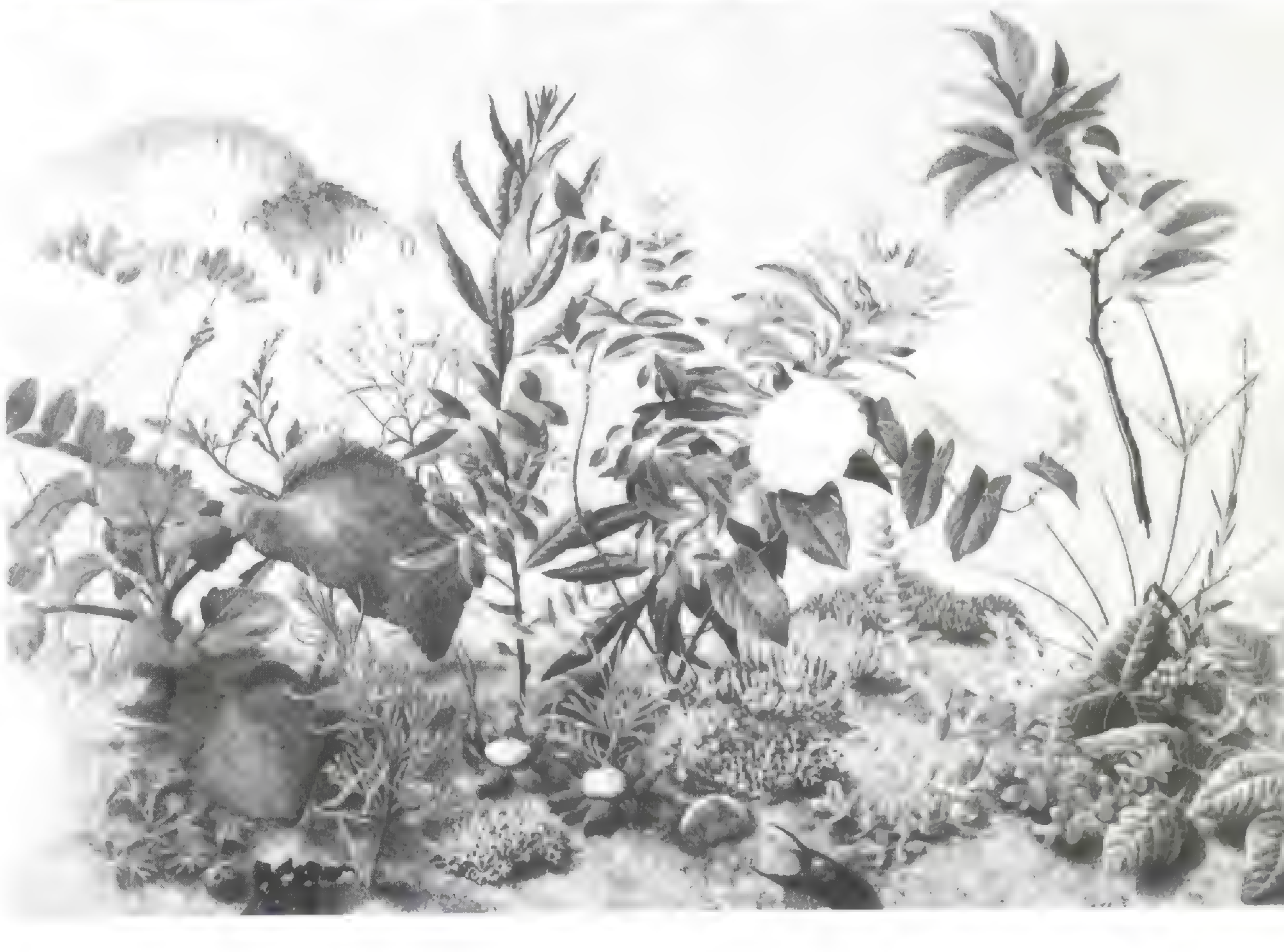
Garden Receives USAID Support

Missouri Botanical Garden has received a grant of $150,000 from The United States Agency for International Development (USAID) to conduct a 3-year study of economically useful plants of the Eastern Andes. Focusing on selected areas in Peru, the project will survey the diverse and largely unknown tropical flora for new sources of food, timber, pharmaceuticals, and oils. This is the Garden's first grant from USAID. Through its research programs, the Garden cooperates with institutions worldwide in conservation efforts, and planning for sound land use.

USAID assistance programs in developing countries aim to increase productive capacities, promote economic and political stability, and develop human resources. The Garden will conduct the current study in cooperation with the Universidad Nacional de Amazonía Peruana in Iquitos, Peru. The two institutions have collaborated on Peruvian plant research for the past five years. The USAID funded research will increase scientific understanding of tropical plants, train Peruvian botanists, improve research facilities in Peru, and help foster cooperative relationships between the two countries.

Author James A. Michener *and his wife, Mari, visited the Garden recently. Director Peter H. Raven conducted a tour of the Japanese Garden for them.*

Two new prints by Keith West *are available at the Garden Gate Shop. "Wildflowers of the Cape Cod Shore" (pictured) and "Wildflowers of the Pacific Coast" are numbers five and six in his Wildflowers of North America series, commissioned by the Garden and the British Museum (Natural History).*



Notes from the Garden

January and February are not usually months in which people think of visiting the Garden, but there are as many reasons to visit during the winter as during the rest of the year. In the Climatron, Desert House and Mediterranean House it is hard to recall the winter outside. Imagine in February to be looking over thriving cactus, an acacia blooming, a papaya tree. It's all here. On weekends, heated trams run over the carefully plowed paths in the Garden so that you can see the Japanese Garden and English Woodland Garden in the snow. The Japanese consider snow as a flower in the planning of their gardens, and our example here is possibly at its most beautiful in snow.

Designer of the Japanese Garden Koichi Kawana made one of his regular visits here in late fall. According to him, "We have begun planting trees along Alfred Avenue to screen out the buildings there from the Garden. We are also planning a Cherry Grove walk between the mounds and the Alfred fence. The Grove will be in contrast to the rest of the Japanese Garden, which is very open, similar to a *daimyo* lord's Garden. The planting in Cherry Grove will be more heavily concentrated to create an area of tranquil seclusion."

More than flowers grow at Shaw's Garden. Minds do too.

Educational programs for adults recommence in February with five courses offered during the month. On five consecutive Wednesday afternoons beginning February 3, **Gardening from the Ground Up** provides an introduction to essential gardening techniques for the new gardener. Fee for Members is $25.00.

If you're intrigued by the idea of experiencing the Japanese Garden under a full moon in winter, consider joining the **Evening Walk in the Japanese Garden** on Saturday, February 6, 4:30 to 6:30 p.m. The walk will be conducted by our Curator of the Japanese Garden, Charles Hooker. Cost to Members is $5.00. Plum wine will be served.

The third program in February is **The Perennial Garden**, scheduled for three consecutive Tuesdays beginning February 9. The course meets from 7 to 9 p.m. and concerns the most important species of perennials and their cultural requirements. Taught by staff horticulturist Brian Ward, the course costs $14.50 for Members.

A two-session course on **Winter Tree Identification** is scheduled for Wednesday, February 10, from 7 to 9 p.m. and Saturday, February 13, from 10 a.m. to 12 noon. The instructor is Robert Herman, Coordinator of Adult Programs, and the fee for Members is $11.50.

Because of its popularity this fall, **Botanical Illustration** will be offered again during February. Expanded to five sessions, the course is designed to accommodate people of varying artistic ability and experience from the curious doodler to the professional artist interested in the finer points of plant illustration. The course meets on five consecutive Thursdays beginning February 4, from 7 to 9:30 p.m. The cost is $33.50 for Garden Members.

All five courses meet in the John S. Lehmann Building.

A conference not held at the Garden, but one in which you may be interested is the **Global 2000 Conference**, held on Friday, February 26, 3-9 at the Chase Park Plaza Hotel. The Conference concerns the results of the *Global 2000 Report to the President* published in 1980 by the U.S. Council on Environmental Quality and the U.S. Department of State. It predicted conditions that will develop if present trends continue. Among those predictions was that 15 to 20 percent of plant and animal species now living will be extinct by the turn of the century, causing drastic consequences. The speakers include Anne and Paul Ehrlich and Dr. Peter H. Raven. The conference is partially sponsored by the Garden and registration is $2.00; dinner is $14.00. For reservations or information, please write: Coalition for the Environment, 6267 Delmar Avenue, St. Louis, Missouri 63130.

The Tea House was revisited recently by Toshitane Hirabayashi, who supervised its construction just over five years ago. Our Tea House was built in Matsumoto City, Japan, by master-craftsmen according to ancient tradition. It was then dismantled, shipped to the Garden, and reconstructed. It was dedicated in a formal ceremony in October, 1976.

The Isabelle Schwerdtmann Carillon was installed in Tower Grove House in December. The electronic instrument recreates the sound of 49 cast bronze bells. It will chime the hours through the day and play short musical selections twice daily.

Two lectures by Dr. Ron Taven, Professor of Horticulture at University of Missouri, will be presented on Wednesday, January 13. The first, set for 10:30 a.m., is entitled "Trees are our Roots," and concerns the importance of trees to mankind. His second lecture—at 8 p.m.—"Our Earth is a Garden," deals with the reasons people garden. The lectures will be in the John S. Lehmann Auditorium and are co-sponsored by the Garden Club of St. Louis. Members are admitted free and may bring guests.

The Education Department seeks volunteers to operate audio-visual equipment for lectures and special events sponsored by the Garden. Training sessions will be held on a regular basis to familiarize volunteers with the equipment, which includes slide projectors, a dissolve system, microphones, and stage lighting.

Persons interested in further information should contact Judy Studer in the Education Department, (577-5140), by February 1.

Specimen number 1,831,651 in the Garden's herbarium is a fern, *Asplenium magellanicum*, collected in December 1834, by a then-25 year old Charles Darwin. The scientist aboard the *HMS Beagle,* Darwin collected the plant on the coast of Chile when the ship docked there to take refuge from a storm.

Elsewhere in this *Bulletin* Alan Godlewski describes some interesting, new hardy plants that he transported from China to our Garden. His visit and those plants are part of the continuing cultural and scientific exchange between us and the PRC. Another part of this exchange is the spring, 1982, Members' trip to China. Leaving St. Louis on April 24, the tour will include visits to Beijing, Nanjing, Wusi, Shanghai, and Kyoto, Japan, and will return to St. Louis on May 13. Reservations are available, and may be made by calling the Members' Office at 577-5118. A brief series of **lectures about China** will be presented by the Garden in the near future. Specific information will be included in the Spring Course Programs brochure. You should receive this in the mail shortly. **Another tour designed for Garden** Members is also schedule for April 2-7, 1982. Sponsored by Tower Grove House Historical Committee, the trip will visit Washington, D.C., and historic Williamsburg, Virginia. Missouri Senator John Danforth has arranged for a V.I.P. tour of the White House. The trip has been arranged to coincide with the blossoming of the cherry trees in our capitol. Part of the tour cost is a tax-deductible contribution to the Garden for the refurbishing and restoration of Tower Grove House. Reservations and information are available by calling Martha Jones of Sante Travel Agency at 726-3040. **The Christmas sale in the Garden** Gate and Plant shops will continue through January 17. Larry Reimelt, Merchandise Manager, said. "This is a great opportunity for Members to save on some very fine items as well as to help the shops reduce their inventory to prepare for their move to the Ridgway Center."

Mark Friday, February 5 on your calendar: 1982 Orchid Show Preview Party. This year's party is scheduled for 3:30 until 8 p.m. We have arranged these extended hours for your convenience so that you may have the flexibility to plan your dinner for before or after you attend. Angle parking on Tower Grove Avenue will be provided; we hope you will take advantage of these especially assigned spaces to avoid traffic congestion.

NEW MEMBERSHIPS

October & November 1981

SUSTAINING MEMBERS

Mr. & Mrs. A. F. Boettcher, Jr.
Mr. & Mrs. James Brickey
Mr. & Mrs. Robert F. Brown
Ms. Ruth E. Buerke
Mrs. John G. Burton
Dr. & Mrs. Ralph Copp
Mrs. Ernest A. Eddy, Sr.
Mrs. Elaine W. Ernst
Mr. & Mrs. Herbert I. Finch, Jr.
Miss Florence E. Freyermuth
Mr. & Mrs. T. Walter Hardy, Jr.
Mrs. Milton H. Just
Ms. A. Donna King
Mr. H. Terrance Kurrus
Mr. Alan L. Lieberman
Mr. Frederic G. Maurer, III
Mr. & Mrs. C. S. Newhard
Ms. Sandra Posen
Dr. Robert L. Quaas
Mr. & Mrs. John T. Ruester
Dr. & Mrs. Joseph F. Ruwitch, Jr.
Ms. Anna E. Saban
Mr. & Mrs. William Schueller
Mr. & Mrs. Russell A. Schulte
Mr. & Mrs. Charles H. Spoehrer
Miss Diana Wallach
Mr. & Mrs. Robert Williams, Jr.

CONTRIBUTING MEMBERS

Dr. & Mrs. Oliver Abel, III
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I certify that the statement made by me above is correct and complete.
(Signed) Joseph M. Schuster, Editor
Manager of Publications

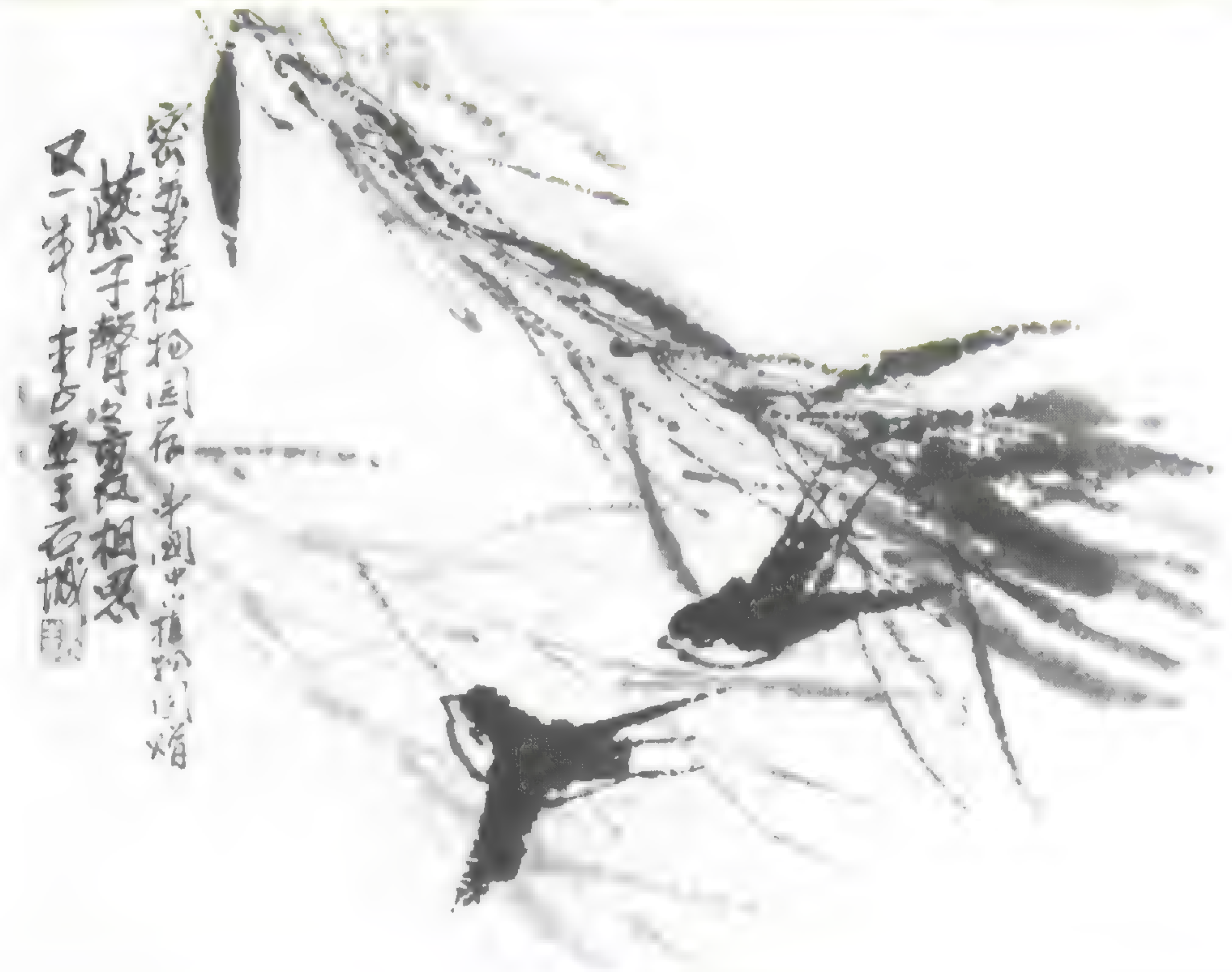
Calendar

January

January 1-9	**After-Holiday Sale,** Gate Shop and Plant Shop, continues through January 17, 10 a.m.-4:30 p.m.
January 10-16	**Lectures by Dr. Ron Taven,** Lehmann Auditorium, January 13, 10:30 a.m. & 8 p.m. **After-Holiday Sale:** Continues
January 17-23	**After-Holiday Sale:** Final Day, January 17.
January 24-31	**New Year of Trees:** Mediterranean House, opens January 30, 9 a.m.-4:30 p.m. (through February 21)

February

February 1-6	**Orchid Show Preview Party,** Climatron, February 5, 3:30-8 p.m. **1982 Orchid Show** Climatron (opens February 6) 10 a.m.-4:30 p.m. (through March 7) **New Year of Trees:** Continues
February 7-13:	**New Year of Trees:** Continues **1982 Orchid Show:** Continues
February 14-20	**New Year of Trees:** Continues **1982 Orchid Show:** Continues
February 21-28	**New Year of Trees:** (last day February 21) **1982 Orchid Show:** Continues



The characters translate: "To Missouri Botanical Garden from Sun Yat-Sen Memorial Botanical Garden, China: One year is past; remember each other in the song of the swallow." The painting was presented to Alan Godlewski during his recent trip to China.

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Volume LXX, Number 2
March/April 1982

Tulips: Passion and Sanity

Fable: *Once there was a Persian named Farhed who was in love with a woman, Shirin. Someone repeated to him a rumor that Shirin had died. He was so grief stricken that he mounted his horse and rode full speed off a cliff, killing himself. As the blood flowed from his wounds into the ground, red tulips instantly grew all around him. Today, the red tulip is a symbol of passionate love.*

"For most of our flower shows, we start work nine to twelve months in advance," Brian LeDoux said. He talked to us on a cold January morning. His office was crammed with a desk, a drafting table, another table, a chair, and a stool. There were reference books stacked and lined on the table; books on the history of plants, horticulture, and man's spiritual, physical, and superstitious relationship to plants. LeDoux was trained as an artist and has been designing the Garden's flower shows for 7 years. He began designing them as part of his job as a horticulturist in the Climatron. When the number and complexity of shows increased, a new position was created for LeDoux as a full-time designer.

"This Spring Flower Show opens on March 6 and we ordered the bulbs for it last June. I'm beginning work now on the mum show for this September." During our conversation, he was interrupted with several telephone calls about the Orchid Show which, at that time, was four weeks away.

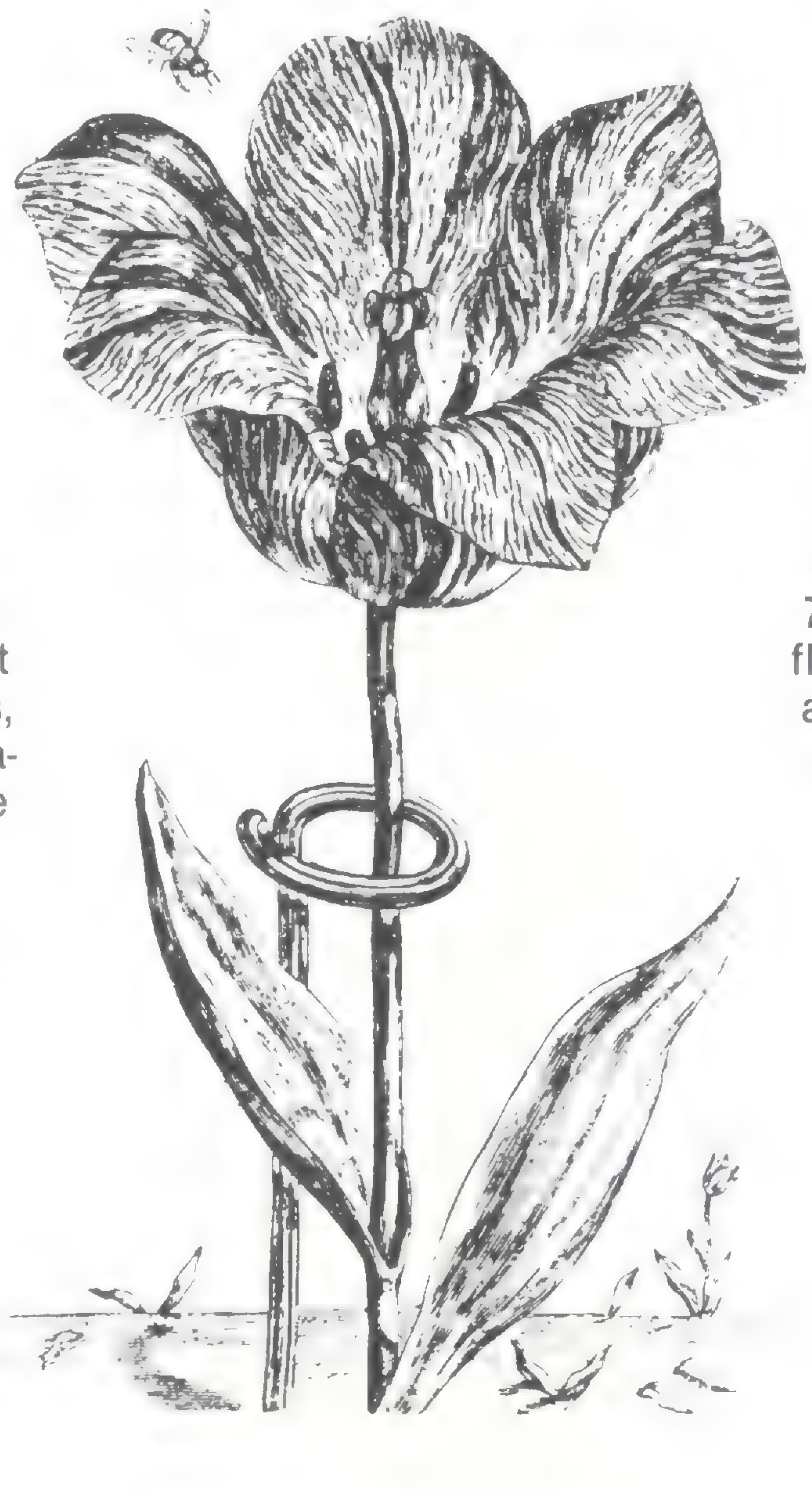
"Before we ordered the bulbs, we had to decide what we wanted. We requested bids from four Holland growers." Most spring bulbs come from the Netherlands, although growers in California and the Pacific Northwest have recently entered the market.

Market

Tulips came to the Netherlands from Turkey (to where the earliest mention of tulips can be traced) via Prague. A man named Carolus Clusius, who was prefect of the Royal Medicinal Garden in Prague, received some tulip bulbs from a friend of his in Turkey. When Clusius left Prague in 1593 to become curator of Hortus (the Leiden botanical garden), he brought tulips with him. Men who saw them saw a tremendous commercial potential for the flowers; some asked Clusius to sell bulbs to them. When he refused, they stole a number of bulbs from Hortus. Disgusted after the robbery, Clusius abandoned his work with tulips.

By the turn of the 17th Century, Holland was in the midst of prosperity. Its wealthier citizens began buying tulips for their gardens and a competition developed. The price of the already costly flowers rose quickly. Men began investing in them, buying bulbs at inflated prices and reselling them at ridiculously higher prices. Some bulbs—single bulbs—were sold at a cost equal to that of a country estate. Ministers and legislators attempted to stop the speculation; sermons were preached against "the immoral folly;" laws were passed prohibiting it, but it continued as a black market. The profits—one source quoted 60,000 florins ($44,000) for a single month—were too tempting.

Then on February 3, 1637, it was as if men were just awakening. At an auction on that date, buyers suddenly did not bid the prices that sellers established. Within three months, the market crashed; fortunes were lost. Tulipmania *became known as "wind trade" because men were dealing in something insubstantial. The high prices were extremely artificial and precarious.*



The list of flowers that will be used for the spring show is a long one. "We ordered 3,500 tulips, 1,200 narcissus, 500 hyacinth, 400 crocus." There are 7,350 bulbs in all, 14 different types of flowers. "We will have 16 forms of tulips alone. We wanted to emphasize to our visitors that there are many different types of tulip."

They are named Darwin. They are named Rembrandt. They are named Chopin and Verdi. They are named Attila.

Price

It was a bulb named "Semper Augustus" and in 1624, it was sold for the equivalent of $1,200. The next year, two were sold for $3,000. A little later, three were sold for $30,000. A bulb named Viceroy was purchased for "two

(continued on page 4)

Comment

As most of you know, Missouri Botanical Garden has been pursuing tax support through the Zoo-Museum District in order to secure a stable financial base so that we can continue to provide our vital educational, scientific, and cultural services to the community. In January, St. Louis Mayor Vincent Schoemehl and St. Louis County Executive Eugene McNary proposed a new economic development plan for the city and county which includes support for the Zoo-Museum District as part of a one-half cent sales tax levy.

As this *Bulletin* goes to press, the Board of Trustees of the Garden have voted unanimously to endorse this proposal; legislative hearings on the plan are imminent. This bold proposal offers great promise to the future of the St. Louis economy with its support for economic development, tourism, and cultural institutions.

The Garden must establish a strong financial foundation as we move forward through the current decade and beyond, during which time the need for us to continue to maintain the diversity and quality of our services will become ever greater. This proposal recognizes the Garden's importance to the cultural and economic life of St. Louis and we urge all of our Members to support it.

Peter H. Raven

Anne Lehmann Donates Restaurant

Completion of the Gardenview Restaurant in the Ridgway Center will now be possible through a generous contribution by long-time Garden supporter Anne L. Lehmann. The restaurant, with a capacity of 175, will be decorated according to a tropical rainforest theme, calling public attention to the Garden's active tropical botany program. Anne L. Lehmann received the Garden's 1980 Henry Shaw Medal. Her late husband, John S. Lehmann, was President of the Garden's Board of Trustees from 1953-57.

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Board Elects New Trustee, Officers

Donald Danforth, Jr.

Donald Danforth, Jr. was elected to the Garden's Board of Trustees at the Board's January meeting. He is President of Danforth Agri-Resources, Inc., a diversified investment and management company. He also serves as a director of Ralston Purina, Centerre Bank, and Centerre Trust Company. Active in civic leadership, Mr. Danforth is President of the Board of Trustees of Mary Institute, and is a trustee of St. Louis Children's Hospital, and the Danforth Foundation. He also serves on the boards of the St. Louis Area Council, Boy Scouts of America and the Arts and Education Council of St. Louis.

Commenting on the election of Mr. Danforth, C. C. Johnson Spink, President of the Board, said, "We are quite fortunate in this new association with Mr. Danforth, who brings to this office not only his unique abilities and experience but also a deep commitment to the Garden as an important scientific and cultural resource."

The Board reelected Mr. Spink as President, and William R. Orthwein, Jr. as First Vice-President. Robert R. Hermann, Sr., was elected to the position of Second Vice-President. He succeeds Daniel L. Schlafly who had served in that capacity since February, 1975. Mr. Schlafly will continue as an active board member.

Charles W. Orner was reelected as Secretary, and the Garden's Assistant Controller, Cheryl B. Mill, was elected to the newly created office of Assistant Secretary.

Ridgway News

Education Wing named for Jordan

The Garden's Education Department will be located in the Ridgway Center following its completion later this year. Consisting of three classrooms, a resource and reference center, a plant science laboratory, and an educational greenhouse, the education wing of the new center will be named for Mary Ranken Jordan and Ettie A. Jordan in appreciation for the generous support of the Foundation they established. "By more than tripling our educational capacity, the Jordan Education Wing will enable us to expand our programs, which presently serve 40,000 students each year," said Peter H. Raven, the Garden's Director. The Jordan Foundation, a St. Louis-based foundation, was established in 1957.

Resource Center

Part of the Jordan Education Wing will be a resource and reference center, provided by the support of the May Stores Foundation, Inc., and the Norman J. Stupp Foundation.

A new concept for the Garden's educational program, the Center is designed for use by teachers, youth group leaders, and others to assist them in developing lectures and workshops. The Demonstration Room, a gift of the May Foundation, will include lab tables and equipment. The Reference Room, a gift of the Stupp Foundation, will include slides, reference books, and curricula files.

CBS Grant for Classroom

On January 18, the Garden received a grant from the Columbia Broadcasting System to provide for the design, construction, and furnishing of one of three classrooms in the Jordan Education Wing. The $132,500 grant was one of 13 awards that CBS made to St. Louis area institutions. In presenting the grants, CBS President Thomas H. Wyman said, "These grants serve as a recognition of 13 marvelous, effective, and quite different organizations in this city."

Accepting the grant for the Garden, C. C. Johnson Spink said, "Because of this generous grant from CBS, we will be able to reach even more students of all backgrounds and circumstances, and increase our effectiveness as an educational resource for the community. We sincerely appreciate the concern and support that CBS has shown, not only to the Garden but the entire area."

Louis Sachs, Construction Man of Year

Louis S. Sachs, a member of the Garden's Board of Trustees and Chairman of the Building Committee, was named the Construction Man of the Year by the St. Louis Construction News and Review. He was selected for his vision in acquiring 1,500 acres near Highway 40 and Clarkson Road in Chesterfield, and for his perseverence in transforming raw land into one of the largest planned retail, office, and residential communities in the country.

Louis Sachs worked as a special consultant to the Garden's Building Committee prior to his being elected to the Board of Trustees in January, 1980. Following his election, he was named Chairman of the Building Committee.

Tulips

(continued from page 1)

loads of wheat, four loads of rye, four fat oxen, eight fat swine, twelve fat sheep, two hogsheads of wine, four barrels of beer, two barrels of butter, 1,000 pounds of cheese, one complete bed, one suit of clothes, and one silver tankard."

The Darwins are yellow; the Chopins are yellow touched by orange; the Verdi's are red and yellow. The Rembrandts are worthy of their name, being multi-colored, the color seeming to have been brushed on to the petals. The Attilas are purple.

"The spring show this year is in the Linnean House," LeDoux said. "Since quite a few of the camellias that are permanently in the house will be in bloom, most of the bulbs we ordered were meant to be compatible with the camellias. The color location of the bulbs will be based on the camellias in bloom. You don't want colors to clash."

Loss

After the tulip market collapsed in 1637, men were financially ruined. Some committed suicide. Everard Fortius, a botany professor at the University of Leiden, came to hate tulips. He began beating the bulbs with his cane.

"I grow the flowers." Steve Wolff is a staff horticulturist who talked about caring for the almost 7,400 bulbs as though they were no more than a handful. "We potted these bulbs in the last week of October. Six tulips to a six-inch pan; one hyacinth to a four-inch pot; the narcissus are three to a six-inch pan. We used equal parts peat, soil, and turface. Turface is a substitute for perlite; it doesn't wash away as easily as perlite."

Wolff supervised eleven volunteers who potted the bulbs. "All of our potting for shows is done by volunteers."

After they were potted, the bulbs were placed outside, protected by a cold frame. "The bulbs need 14 to 16 weeks of cold. Most places—large growers and botanical gardens—can put them into cold storage rooting rooms and leave them. Two weeks at 48°; seven weeks, 41°; 32-35° for six weeks. We're at the mercy of the weather. If a bulb needs 16 weeks of cold before we bring it in and in the 14th week, the temperature becomes warmer, the bulbs will start growing like crazy, and bloom well in advance of the show."

Plans for the Ridgway Center complex include cold storage facilities. "That will make our work easier," Wolff said.

"In the cold frame, we watered the bulbs thoroughly and use a fungicide to prevent disease. About mid-November we covered them with styrofoam peanuts—the packing material."

"We thought the peanuts would be cleaner and neater," LeDoux said. "In the past we have used sand and organic mulch, but then there is a difficulty in having to clean the sand off and having to dig them out with a pitchfork and run the risk of damaging the plants."

"If we covered them sooner, it would get too warm," said Wolff. "We put a perforated plastic sheet over the styrofoam to keep it from blowing around. Then we placed the cold frame sash over it; I don't close it completely, but leave a six-inch gap so that air can circulate. Once they are in the cold frame and are well-rooted, the temperature can freeze without causing problems. If it freezes before they are well-rooted, the soil becomes too hard for the roots to grow.

"We will bring the tulips inside about February third. To force them, they need about thirty days at 60°. Hyacinth need 14; narcissus, also about 14 days to be forced into bloom."

Sobriety

Tulips can be bought today in garden stores, discount stores, drug stores, groceries. A teenage girl who babysits can buy a small package of bulbs for an hour's earnings—a third the cost of a movie admission; one sixth the price of a record album. You can buy a bouquet of cut tulips for a sick friend in the middle of a bad winter for about the cost of a reasonably priced dinner.

Thirteen million acres of Dutch ground are planted in tulips. Their exports total $200 million, almost 40% of which comes to the United States.

"In the Linnean House, we put the flowers, still in their pots, on the surface of the ground, then mulch around them to cover the pots," LeDoux said. "The flowers are kept in pots so that the root systems of the camellias are not damaged by digging holes for the bulbs. It will take about two dump truck loads of mulch to mask the pots. We use leaf mold. The taller bulbs will be in back; shorter in front, in groupings of one color. Say 20 pots of one color in one group. Their color can be appreciated in a group better than one here, one there.

"Once the exhibit is in, it needs regular daily maintenance—watering, removing the plants that are finished blooming, and replacing them with others.

"The last thing we do is the labeling of the flowers and posting the interpretive material—information on cultivation, history, and so on.

"After the show, it will take us two days to remove it. We have to leave the place as we found it."

Plants Monitor Pollution

(continued from page 7)

will be useful in his work in monitoring pollution—the Tradescantia or spiderwort plant.

"While at Missouri Botanical Garden, I was able to visit Dr. William Lower (University of Missouri-Columbia), and Dr. T. H. Ma (Western Illinois University in Macomb). They have been working with Tradescantia for two years.

"When it is exposed to pollutants, its cells grow additional micronuclei. The more pollution there is present, the more micronuclei that grow in the cells. We can see these under a microscope as small black dots. This will be very useful in our work.

"We prefer to use plants to monitor pollution because it is simpler and less expensive than instruments, which are difficult to acquire in China."

Pollution began to become a problem in China in the early seventies, he said, following the end of the Cultural Revolution. "Farmers began coming to us to ask for help in determining if the increased pollution was causing damage to their crops. Our work began in about 1973."

Part of Wang's work also included the compilation, with colleagues throughout China, of a list of 100 plants that were highly resistant to pollution. "The government wanted to encourage garden-factories to make a nice place for the workers. They asked us to determine which plants would be suitable for planting around factories, for parks, and walkways."

Gardening in St. Louis

Home Vegetable Gardening Tips

In 1981 there were 38 million home vegetable gardens. This amounts to 47% of all American households. It is projected that up to 6 million more will join the ranks for 1982.

Advantages of "Growing Your Own"

Many people are initially attracted to vegetable gardening with the idea of cutting their food bills. Although a veteran vegetable gardener will certainly save money, the beginner who has to buy tools, fertilizer, soil conditioners, etc., may be disappointed with how much he "saves."

There are, however, many other even more important reasons to vegetable garden. At the top of my list is that vegetable gardening is fun. There are few greater thrills than seeing seeds, which you sowed, sprout and mature to vegetables for your table. The joys of vegetable gardening can be multiplied by sharing garden space with neighbors or developing a "mini" garden for children.

Superior taste is another factor. Vegetables found in supermarkets are commercial varieties that ship and keep well, have a good appearance, and produce high yields. To most home vegetable growers these characteristics are not critical. When you "grow your own" you can select the most delectable varieties of leaf lettuce or exotic vegetables which will never appear in your grocer's cooler.

Most commercial vegetable growers must harvest their produce before it is ripe so it can be shipped to distant markets. Home vegetable gardeners can let vegetables ripen to their peak color, flavor and nutrition.

What to Grow

Here are some guidelines:

- Grow vegetables that your family will eat. Do not waste precious space and time on less desirable vegetables. For instance, radishes are fun to grow, but who wants to eat a whole row of them?
- Grow vegetables not available at your market, like celeriac, okra, leeks, New Zealand spinach, and shallots.
- Grow the most perishable, but high-quality vegetables like leaf lettuce.
- Grow at least a few new varieties each year. These introductions are usually disease-resistant and vigorous.
- If you have limited growing space, stay away from crops like corn and melons. They do not yield much for the space they need.

One of the best vegetables all gardeners should grow is lettuce. It does not take up much space, is easy to grow, and is delicious. Lettuce is available in four types—Head or Crisphead, Leaf, Butterhead, and Cos or Romaine. My favorite is the Butterhead type. Unfortunately, many varieties of this type of lettuce "bolt" (go to seed) in hot weather. One of the best-quality, heat-resistant types is one called "Buttercrunch." "Tom Thumb" is a good miniature variety which can be grown in containers. If you want a variety of colors and textures in your salad, you may want to grow one of each type of lettuce. I would not recommend growing the head-type lettuce like Iceberg. It is more difficult to grow and usually yields inferior quality lettuce compared to other types.

New Explorer potato from Stokes is the first potato you can grow from seed rather than "eyes."

Lettuce grows best in cool weather. Begin sowing it indoors in early March to be transplanted outdoors in early April. Seeds of lettuce can be sown outdoors in a cold frame in mid-March or outdoors in the ground around early April. These seeds can then be sown at 30 day intervals until late summer. Lettuce loves a high nitrogen fertilizer (the first number on the fertilizer bag). Nitrate of soda or urea are good ones. When your lettuce is young, apply light doses of fertilizer every few weeks. It is best to harvest lettuce when it is young because as it gets older it develops a bitter taste. Although lettuce grown in full sun will be most vigorous, it can also be grown fairly well in partial shade.

Another excellent salad material is spinach. One of the best varieties for our warm summer is "Melody." This is an All American hybrid which is disease-resistant. Provide the same growing conditions for spinach as lettuce.

New for '82

Sugar Snap Peas are certainly one of the finest quality vegetables to grow in the home garden. This sweet-tasting pea can be eaten raw, pod and peas together, with a dip, stir fried, or lightly cooked.

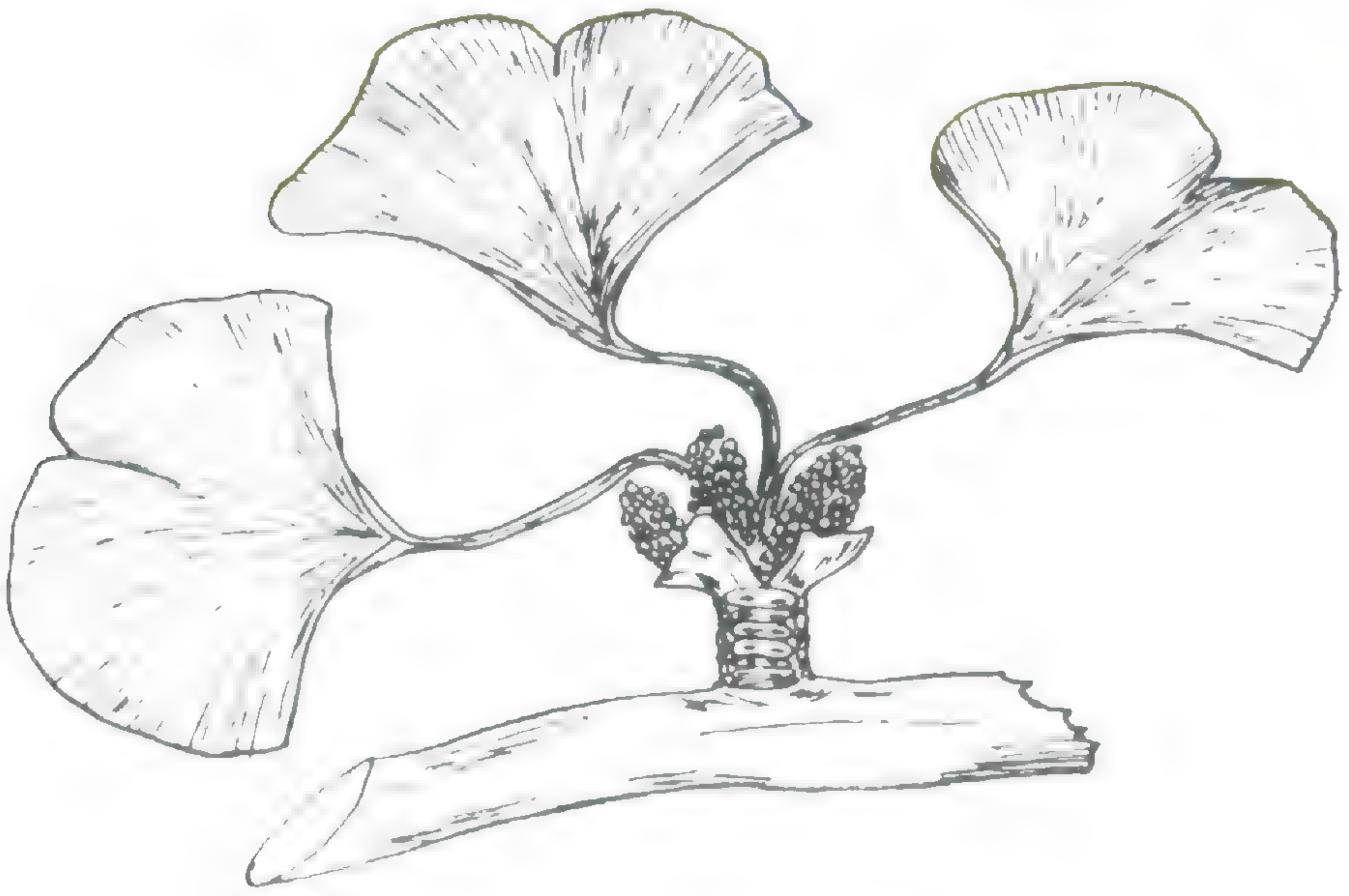
Unfortunately some home gardeners found the 6 foot growing height of this pea hard to cope with. A trellis of some type was a necessity. Luckily, the plant hybridizers were quick to realize this problem and have introduced for this year a new type of pea which tastes like the Sugar Snap Pea but has a compact, bushy-type growth habit. Several varieties will be available including Sugar Bon from Park Seed Co., Sugarrae from Hummert's Seed Co., and Sugarmel from Gurney's Seed Co.

Another exciting introduction for 1982 is the "Explorer Potato." Unlike most potatoes which must be started from sections of mature potatoes, this variety can be sown from seeds in the same way as tomatoes or peppers. If you have some extra space in your garden and haven't tried potatoes before, try out this new variety.

Since these peas and potatoes are new for 1982, it would be advisable for you to obtain them from your seed supplier as soon as possible to avoid being disappointed. They will probably sell out early.

—Steven A. Frowine, Chairman, Indoor Horticulture

Emblem of Changelessness



We are struck by its color in autumn—the bright yellow that its fan-shaped leaves become. Holding a leaf, twirling it between thumb and index finger until it blurs from the spinning, we are struck by something else, something we recall reading—that this species of tree, the maidenhair *(Ginkgo biloba),* was rooted in the earth, growing, its leaves appearing, turning from green to gold, then dropping, millions of years before there was even a single man to find a ginkgo leaf, hold it, spin it until it was a blur of yellow. From the time the ginkgo first appeared until now, the equivalent of nine million generations of man has passed—more than 180 million years. The earliest hominids *(Ramapithecus)* appeared about twelve million years ago; *Homo sapiens,* perhaps 400,000 years ago.

The paleobotanist Sir Albert Seward, who wrote much about the ginkgo, said in 1938, "It appeals to the historic soul; we see it as an emblem of changelessness, a heritage from worlds too remote for our human intelligence to grasp, a tree which has in its keeping the secrets of the immeasurable past."

Ginkgo biloba is the sole-surviving species of a family of trees that once had an almost world-wide distribution. Fossils of the ginkgo and its relatives have been found in Australia, Asia, Europe, and North America. Preserved leaves have been discovered in Oregon, in barren Alaska bordering the Arctic Ocean; in Siberia, Greenland, and England. Geologic upheavals beginning about 75 million years ago, including an ice age, destroyed the ginkgo in most of the world, probably limiting its existence to China; perhaps to a ten-square-mile area in the Chekiang Province. Through cultivation, it has spread through the world again, being reintroduced into areas it inhabited when dinosaurs dominated the earth.

Since there is no substantial evidence that any wild ginkgos exist today (although Frank Meyer, a plant explorer for the U.S. Department of Agriculture, and a member of the Garden's staff in 1904-5, reported finding a ten-square-mile area of wild ginkgos in China in 1905) credit for the preservation of the trees is given to Chinese priests who cultivated them near temples; it has been suggested that these priests considered the tree sacred.

Man's earliest records of ginkgo appear in the eleventh century in China; possible references to it have been found as early as the third century, where a fruit named P'ing Chung Kuo is mentioned in a poetical essay. However, as yet no scholar has been able to verify that this mention of a "silvery-colored fruit" is in fact the ginkgo.

The tree was introduced into the west by Engelbert Kaempfer, a Dutch surgeon, who observed the ginkgo in Japan in 1690. He described it in his *Amoenitatum Exoticarum* (1712), naming it "Ginkgo." There is much speculation that the name was an error of transcription, an erroneous combination of the words "Icho," (which some claim is the word Kaempfer intended for the tree) and "Ginnan," (the name he intended for the fruit). The Latin name, *Ginkgo biloba,* was given to the tree by Carl Linnaeus; *biloba* because the leaves are divided into two symmetrical halves by a V-shaped median.

In 1784, an Englishman, William Hamilton, brought the ginkgo to this continent, planting several trees in Philadelphia. Two of these still stand and are the oldest ginkgos in the United States. Today, the ginkgo is frequently used for landscaping, especially along streetsides; popular because it is hardy, is an excellent shade tree, and because its foliage is so striking in the autumn. Its wood is used as firewood, and for carved chessmen, and fine oriental lacquerware. Its nuts, yellow, fleshy seeds about the size of cherries are, as Meyer reported, "eagerly collected, cleaned of the ill-smelling pulp that surrounds them, and sold as a delicacy especially in central and southern China. They are always slightly roasted before being eaten, but their flavor does not appeal to the palate of the [West]."

Scholars have suggested several theories to explain the longevity of the species. Individual ginkgos are remarkably long-lived; specimens in Asia are 1,000 years old, with one tree in Yongmun-san, Korea, being over 1,100 years old, and probably the oldest ginkgo in the world. They are apparently not affected by the numerous insects and pests that plague other trees, and have a high tolerance to smog and industrial pollution. Edgar Anderson, writing in the *Bulletin* in 1967, suggested that the ginkgo once had parasites but that it has outlived them. David M. Jarzen (*Neotoma* 1981) observed, "It is ironic that the oldest living species of trees is better suited to man-made, often polluted environments than almost any other tree."

The longevity of the species has been partially attributed to the fact that the individual trees are so long-lived. Writing in *Science,* Randolph T. Major said, "Evolution occurs largely through mutations of the genetic material [DNA]. These changes may be brought about by chemical or physical means…radiation…But while, both…radiation and chemicals are undoubtedly capable of causing mutations of…ginkgo trees, the importance of these changes is kept to a minimum by the rather long time span from one generation to the next. These trees do not begin to reproduce until they are more than 20 years old, but they continue to reproduce up the age of over 1,000 years…they have very much less chance of changing their characteristics than most other plants have, for most plants have a shorter reproductive period."

There are ginkgos in several places in the Garden—along the path between Tower Grove House and the Japanese Garden; two flank the Main Gate near the lily pools; another is located near the Shoenberg Fountain beside a group of another "living fossil"—the Dawn Redwood, between the John S. Lehmann Building and the Administration Building.

Letter from New Caledonia...

I have recently returned to St. Louis from a two-week stay in New Caledonia, and I thought I would write you a short note describing some of my impressions and experiences there. As you may know, the XIII International Botanical Congress was held in Sydney, Australia, in late August and was attended by about 3,000 botanists from around the world, including seven of our own Garden staff members.

I spent two weeks after the Congress with Gordon McPherson, our Assistant Curator stationed in New Caledonia, and had an opportunity to see there, firsthand, the work he does. Our first week was spent camping in an area that was formerly mined for nickel and through which runs a maze of old mining roads, most still in reasonable repair. We were able to penetrate about ten miles into the mountains, covering the distance in about two hours in the Land Rover which we have stationed there. Ultimately, the road was blocked by sideslips, and we camped in two different spots, making walking trips further down the roads to the patches of forest which remain on some slopes and in several valleys. Formerly, when prospecting was being done, the forest was simply burned off to make access easier. Due to the poor soils in the area, regeneration of the forest takes a tremendous amount of time, and this entire area, once forested, is now reduced to a low scrub dotted with the bare trunks of many of the trees that once stood in the area. This burning took place 30 or 40 years ago, but still there is no sign of the forest regenerating. The areas that escaped burning apparently escaped because they did not appear likely spots for mineral prospecting or perhaps because the slopes were simply too steep and inaccessible.

The highlight of our collecting on this trip was the discovery of a new locality for the new species of *Oncotheca* which he discovered about a year and a half ago. *Oncotheca* is a tree that grows to about 60 feet. This genus is the only genus of the family Oncothecaceae, and before he arrived in New Caledonia only one species was known. He has now discovered a second and will be describing this as a new species later this year. The family occurs only in New Caledonia and its relationships to other plant families are obscure. In fact, the genus has been placed in several different families through the years as additional studies have indicated different relationships.

The second week was spent mostly in the area of Nouméa, because several other botanists arrived during this period, having made arrangements with Gordon ahead of time to have him help them with their fieldwork in New Caledonia. Each botanist arrived with a long want-list of plants to be seen, collected, or photographed, and Gordon was able to find most of these plants for them. It was interesting to see the different kinds of projects that people are carrying out which involve plants from New Caledonia. One person who visited during my stay was Leo Hickey of the Smithsonian Institution, who is interested in leaves of primitive plants because he is a palaeobotanist working with fossil leaves. By doing very careful studies of the venation of leaves, he hopes to be able to both add to our knowledge of the overall classification of plants and make the identification of fossil material more reliable.

For my own part, I collected about 300 specimens of mosses during my two weeks in New Caledonia. I also collected a few liverworts, and one is a significant addition to the known flora there. It is one of the most primitive liverworts in the world, and will soon be described as a new species in the *Annals,* our scientific quarterly.

—Marshall R. Crosby, Director of Research

...And from Israel

We are fortunate to be visiting colleagues at the Hebrew University for four days on our way to join the Garden's delegation to the AETFAT Congress in South Africa.

The joint moss project of the Garden and Hebrew University is flourishing. Missouri Botanical Garden, with its excellent world-wide collection of mosses (over 100,000 specimens), and Dr. Marshall Crosby, a world-renowned specialist in mosses, allowed us to collaborate with Hebrew University. Working with them through reciprocal exchanges of staff, we have been able to complete the initial phase of the project, which included the difficult job of collecting, identifying, illustrating, and providing keys to the identification of different species, and the mapping of the distribution of each species. The next portion of the project, the description of each species, is continuing at full-speed here, in Jerusalem. Finally next year, the Israel Academy of Science will publish the moss flora of Israel in English, concluding this interesting joint project, and significantly adding to the better understanding of the world-wide distribution and the evolution of mosses. *—Tamra Engelhorn Raven*

Plants Used to Monitor Pollution

It has been known for some time that polluted air and water adversely affect plant life; in the 1920s, the Garden purchased land in Gray Summit, Missouri, with the intention of moving Missouri Botanical Garden there because the sulphur dioxide pollution, caused by the burning of soft coal in the city, was damaging the plants within the Garden. Now a botanist from the Peoples Republic of China, Dr. Wang Jiaxi, reports that scientists there are using plants to monitor pollution generated by factories.

"We use the gladiola and buckwheat to monitor pollution levels near factories," said Dr. Wang. "Sulphur dioxide is our most common pollutant; this we can monitor by using buckwheat. Its leaves discolor when exposed to the sulphur dioxide.

"We use the gladiola to monitor fluoride levels from aluminum and phosphorous fertilizer factories. Fluoride will cause the gladiola leaves to turn brown. We plant them at varying distances from the factories, then collect and study them to find the pollution concentration."

Wang was in St. Louis recently as part of the Garden's continuing program of exchange with the Nanjing Botanical Garden, at which he is the head of the Department of Ecology and Environmental Protection. While here, he learned of another plant that

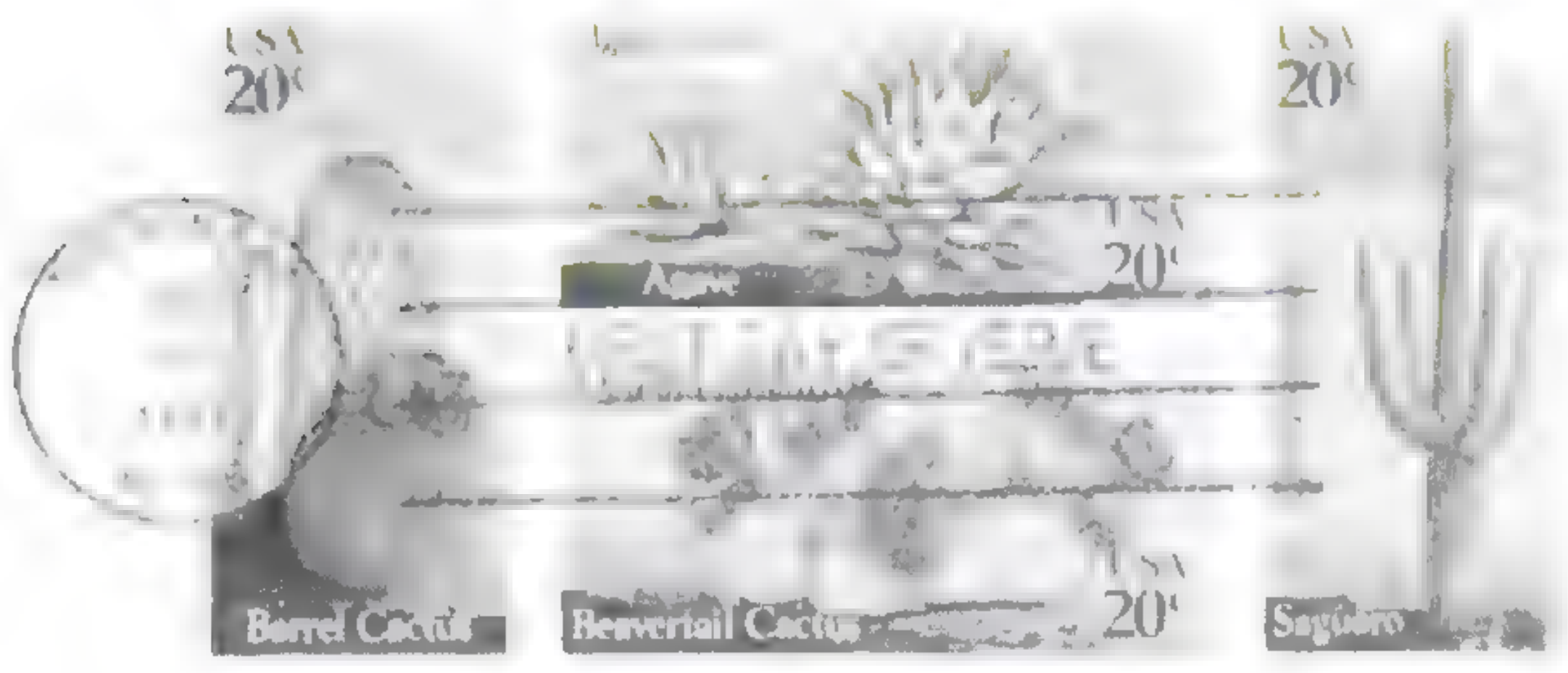
(continued on page 4)

Notes from the Garden

The Henry Shaw Fund Committee were honored by the trustees for their work. Being congratulated by Board President C. C. Johnson Spink (r) are (l-r) Robert Williams, Jr., Patrick Ackerman, Daniel Myers, and Gary Close, four of the Committee's members.

The Arts and Education Fund of Greater St. Louis is one of the most important sources of support for the area's fine cultural life. Organizations that benefit from the A&E Fund include KETC-TV, Opera Theatre of St. Louis, the Repertory Theatre of St. Louis, and Missouri Botanical Garden. The 1982 A&E Fund Drive continues until April 16, and we encourage your support. Further information is available from the A&E, 40 N. Kingshighway, St. Louis, Missouri 63108; phone 367-6330. . . . . .

The Joyce Foundation has renewed its challenge grant to the Garden for 1982. Through the grant, the Foundation challenges the Garden to obtain at least 1,000 new members, and $50,000 in increased contributions from current members during the year. If the Garden succeeds in meeting these goals, the Joyce Foundation will present a grant of $50,000 to the Garden. During 1981, the Garden met the Foundation's challenge, with 4,500 new members, and 1,017 other members increasing their contributions or responding to the year-end Henry Shaw Fund appeal. . . . .



Four, color postage stamps featuring plants of the American desert were issued by the United States Post Office on December 11. The first-class, twenty-cent stamps depict the Barrell Cactus, the Beavertail Cactus, and the Suguaro of the Cactus family, and the Agave. The stamps were issued to recognize the importance of preserving these and other desert plants in their native habitats. Approximately 160 million of the stamps were printed.

The plants featured were all originally collected in the 19th Century by several explorers who shipped them to George Engelmann in St. Louis. Using the specimens, Engelmann wrote the initial scientific descriptions of each and provided the Linnean name of the four plants. The original specimens (the type-specimens) were retained by Engelmann in his private herbarium. On his death, his herbarium was acquired by the Garden, and today those four type specimens are housed in the herbarium in the Lehmann Building where they are available for scientific study.

Dr. Engelmann was responsible for the initiation of the Garden's scientific program, today one of the most active in the world; Engelmann encouraged Henry Shaw to include a research program as part of the Garden he founded. When Shaw created the Henry Shaw School of Botany at Washington University, he endowed a George Engelmann Professorship of Botany. The current Engelmann Professor is Peter H. Raven, the Garden's Director. . . . .

Contributions to the 1981 Henry Shaw Fund surpassed the goal of $350,000 by more than 10%. Harry Wuertenbaecher, Jr., Chairman of the committee announced at the January meeting of the Board of Trustees that $387,110 was contributed to the fund during the year. The Henry Shaw Fund assists in the support of the education programs and provides that the Garden and its facilities are available to the greatest number of people.

Members of the committee for 1981 were Patrick Ackerman, Arthur Boettcher, Jules D. Campbell, Gary Close, Alan E. Doede, W. Ashley Gray III, William Heidbreder, Robert Kresko, Hugh Lewis, Dean Mann, William E. Maritz, Daniel Meyers, Mrs. C. W. Oertli, A. Timon Primm III, George Rosborough, Charles M. Ruprecht, Louis S. Sachs, Richard Shaikewitz, Robert Brookings Smith, Timothy K. Walsh, and Robert Williams, Jr. . . . .

Maureen A. Kelly was recently named Manager of Public Relations for Missouri Botanical Garden. She was formerly the Garden's Public Relations Coordinator.

"We are happy to promote Ms. Kelly to manager of our Public Relations program," Dr. Raven said. "With her abilities and experience, she is an excellent asset in our continuing effort to maintain and improve our communication with the people we serve."

As Manager of Public Relations, Ms. Kelly is responsible for publicity, the expansion of the group tours program, and the supervision of the special events program.

Prior to joining the Garden's staff in February, 1981, she was Regional Advertising Manager for *Missouri Life Magazine,* and a Consumer Affairs Analyst with The Seven-Up Company.

Week of the Young Child: During the week of April 25-May 1, 1982, the St. Louis Association for the Education of Young Children (SLAEYC) will celebrate the Week of the Young Child. SLAEYC is one of 240 affiliate groups of a national, non-profit organization with more than 35,000 members representing a diverse range of services to young children. Service to the St. Louis area includes quality day care and preschool education for children under seven years of age.

This year, the Week opens with a day of programs, entitled "Growing Together with Children," at Missouri Botanical Garden. Admission to the Garden on that day, April 25, will be free to the public, in honor of the week. This is an opportunity for families to enjoy the Garden and to share special experiences with their young children through activities in the John S. Lehmann Building. Details and the schedule for the day will be announced later. . . . .

Shaw Arboretum offers living history programs for students in grades 4-12. These programs are designed to help the students understand our cultural and natural heritage by re-enacting the daily events of the lives of people of our past.

In order to accomodate more students in this popular program, the Arboretum is soliciting materials for it. The list compiled by Greg Krone, Education Coordinator, includes items used in cooking, crafts, carpentry, and recreation during the 19th century. Members having items that they think would be appropriate to a program concerning rural life in Missouri in the 1800s should contact Greg Krone, Shaw Arboretum, P.O. Box 38, Gray Summit, MO 63039, or by calling 577-5138 or 742-3512. He can provide a detailed list for those interested. . . . . . .

The herbarium of Missouri Botanical Garden is the third largest of 1,400 herbaria in the United States, according to statistics published in the 1981 edition of *Index Herbariorum.* The New York Botanical Garden and the U.S. National Herbarium at the Smithsonian Institution are the largest and second-largest herbaria, respectively. The Garden's herbarium is the fifteenth largest in the world; the largest is the Museum National d'Histoire Naturelle in Paris, which has 10.5 million specimens. The Garden's collection contains approximately 3 million specimens.

Index Herbariorum is an international directory of herbaria. . . . .

A Missouri regional chapter of the North American Lily Society is being formed. Interested persons are invited to attend an organizational meeting on Saturday, March 27, at 10 a.m. The meeting will be in the John S. Lehmann Building, and will feature a speaker on lilies, slides of the 1981 International Conference, and a tour of the Garden. For further information, call Fred Winterowd at 1-583-8932. . . .

Flower Sunday for 1982 will be held on April 25, at Christ Church Cathedral, 1210 Locust, in downtown St. Louis. An annual event provided for in the will of Garden founder Henry Shaw, Flower Sunday is intended for contemplation "on the wisdom and goodness of God as shown in the growth of flowers, fruits..." The Cathedral will be decorated with several hundred potted flowers. . . . .

Several benches in memory of C. Powell Whitehead, former President of the Board of Trustees, were recently placed in the Climatron. The benches were purchased with donations made to the Garden's Tribute Fund in the name of Mr. Whitehead. . . . .

Bible Plants for Home Gardens and Church Plantings, an exhibit in the Mediterranean House from March 27-April 25, is a fascinating display of plants resembling those of biblical times, with a concentration on those plants that can be cultivated in St. Louis area home and church gardens.

The 1982 Spring Plant Sale is scheduled for April 16-18. Garden Members are invited to a special Members'-only pre-sale on Thursday, April 15, 10 a.m.-8 p.m. Garden Members will receive a 20% discount on all merchandise in the Plant Shop, including a large assortment of tropical plants, bedding materials, perennials, and vegetables.

. . . .

Of additional interest: Mark your calendars now for May 6-9. The Plant Shop will feature an Herb Sale on those days. The Members'-only presale is May 6; Members will receive a 20% discount. Details will be announced. . . . .

Something to plan for is the Garden's first annual Fall Festival. Members are invited to demonstrate and sell their crafts and hobbies during the three-day festival, October 8-10, in the Ridgway Center. Booth fees are $15 for each day; the $45 must be paid in advance. For information and booth application, please send a self-addressed, stamped envelope to Fall Festival Committee, Missouri Botanical Garden, P.O. Box 299, St. Louis, MO 63166. Applications will be accepted until September 1. . . . .

A sketching workshop is scheduled for May 15, 1982, at the Arboretum. The instructor, Gary R. Lucy, is an award winning, nationally-recognized, wild life artist. The cover of the 1981 Southwestern Bell Telephone Directory is a reproduction of one of his paintings. The course, *How to Organize Your Thoughts for Nature Painters,* will focus on loose sketching of compositional elements of nature. The fee for members is $20. For information, please call Shaw Arboretum at 577-5138. . . . .

The Adult Education brochure was mailed to Members in January. If you did not receive one or would like an additional copy, please contact the Education Dept. at 577-5140 or the Arboretum at 577-5138 or 1-742-3512. . . .

Notes

(continued from page 9)

The Garden's Director of Research, Dr. Marshall R. Crosby, was recently elected a Councilor of the American Society of Plant Taxonomists, a professional society. The Board of Councilors is the governing body of the 600-member organization. The ASPT publishes a quarterly journal, *Systematic Botany,* and a series of monographs. Dr. Crosby is a member of the editorial board for the monograph series. . . . . .

C. C. Johnson Spink, President of the Garden's Board of Trustees received the 1982 Dr. Robert F. Hyland Award for meritorious service to sports. The award was presented by the St. Louis baseball writers at their annual banquet on January 11. Mr. Spink who recently retired as chairman of *Sporting News,* the publication referred to by many as the "bible of sports," was also selected as Sportsman of the Week for *Today* on January 11. . . . . . .

An eight-week training course for new Garden Guides will be held starting in September, 1982. After this training, guides will spend one day a week conducting tours of the Garden for groups ranging from pre-schoolers to senior citizens, and one morning a month for continuing education. Interested persons should contact the Education Dept. at 577-5140 for an interview appointment or further information. . . . .

Because of so many requests, the Garden will increase its hours for visitors beginning May 1. On that day, until October 15, the Garden will be open from 9 a.m. until 7:30 p.m. Display greenhouses will open at 10 a.m. and close at 7:30 p.m. . . . .

For Younger Members

Carrot Root Garden

(ages 7-12)

You can make a carrot root garden by gathering the following materials: 4 fresh carrots that have tiny green shoots at the top, a shallow dish, sharp knife and small stones (purchased at a fish aquarium shop).

First, you need to carefully cut each carrot 1½-inches from the top. Fill the shallow pan with the small stones. Place the carrot roots in the stones. Pour water into the shallow dish making sure to cover the carrot roots and stones.

In a few days, new fern-like shoots should appear atop the carrot roots. The best way to care for your carrot root garden is to water it regularly and to keep it out of direct sunlight.

If no new shoots appear, your carrots were probably too old. When the green shoots appear, they will be using the food stored in the root. If the carrots are too old, the carrot root will not be able to provide an adequate supply of food. Other roots with stored food include beets, turnips and parsnips. They can be used in root gardens also. *—Ann Haley-Oliphant*
Coordinator of Youth Programs

Dandelions

(ages 4-7)

Simple and fresh and fair from
winter's close emerging,
Forth from its sunny nook of sheltered
grass-innocent, golden, calm as the
dawn,
The spring's first dandelion shows its
trustful face.

—Walt Whitman

A young child enthusiastically plucks the fluffy, white seedhead and gleefully blows away the seeds. Like tiny parachutes, they find their way to the ground. Such a familiar sight jogs all of our childhood memories. But when did the seedhead replace the bright yellow dandelion flower perched in its place only a day or two before? Many young children are not aware of the relationship between the yellow blossom and the white seedhead. The following activity will help them observe the subtle changes which take place between flower and seed stages.

You will need: cup of water, aluminum foil, sharp pencil, several dandelion blossoms with long stems. **What to do:** Collect several dandelion blossoms with your child. Fill a cup with water to a level one inch below the rim. Place a piece of aluminum foil over the top of the cup and secure it tightly around the rim. Using a pencil with a sharp point, poke several small holes in the foil, one hole for each dandelion collected. Insert the dandelion stems through the foil holes and into the water. Place the cup of blossoms in a location where they may be easily observed by your child each day. Record the daily changes through verbal exchanges with your child. Within a few days, the petals of the blossoms will close and the seedheads will develop. Your child might even want to pluck a few seeds, inspect them carefully—and then blow the rest away!

Ilene Follman, Educational Consultant

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December 1981 & January 1982

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Calendar

March

In this month... the first Japanese Cherry Tree was planted in Washington, D.C., by Mrs. William Howard Taft, on 3/17/1912... Mount McKinley National Park was enlarged to 2 million acres on 3/19/1932...

March 1-6	**Members' Preview, Spring Bulb Show,** Linnean House, March 4-5, 9 a.m.-5 p.m. **Spring Bulb Exhibit,** Linnean House, opens to public, March 6, 9 a.m.-5 p.m. (through March 21) **1982 Orchid Show,** continues in Climatron, until March 7, 10 a.m.-4:30 p.m.
March 7-13	**Spring Bulb Exhibit:** Continues
March 14-20	**Spring Bulb Exhibit:** Continues (Final day, March 21)
March 21-27	**Bible Plants for Home Gardens and Church Plantings,** Mediterranean House, opens March 27, 10 a.m.-4:30 p.m. (through April 25)
March 28-31	**Bible Plants...:** Continues

April

In this month... Arbor Day was first observed, in Nebraska, on April 10, 1872... Primrose Day is celebrated in England annually on April 19... Charles Darwin died on April 19, 1882... Missouri's Arbor Day is April 22...

April 1-10	**Bible Plants...:** Continues
April 11-17	**Spring Plant Sale,** Plant Shop, Members'-only pre-sale on April 15, 10 a.m.-8 p.m. Sale open to public on April 16-18, 10 a.m.-4:30 p.m. **Bible Plants...:** Continues
April 18-24	**Carnivorous Plant Exhibit,** Climatron, opens April 24, 10 a.m.-4:30 p.m. (through May 16) **Bible Plants...:** Continues (Final day, April 25)
April 25-30	**Week of the Young Child Celebration,** Lehmann Building, April 25, hours to be announced. **Flower Sunday,** Christ Church Cathedral, April 25 **Carnivorous Plant Exhibit:** Continues

Note: Beginning May 1, the hours of the Garden will be 9 a.m. until 7:30 p.m., daily. Display greenhouses will be open 10 a.m. until 7:30 p.m.

Spring

The 1982 Spring Flower Show runs from March 6 through March 21, 9 a.m. until 5 p.m. It is located in the Linnean House, the greenhouse constructed by Henry Shaw in 1882. The Linnean House is the oldest operating greenhouse west of the Mississippi River.

The Members' preview of the Spring Flower Show will be on March 4 and 5, 9 a.m. to 5 p.m. Members will receive a 15% discount at the Greenery Restaurant, Plant Shop and Garden Gate Shop. This year, visitors to the Spring Flower Show will have the opportunity to order bulbs identical to those featured in the Show. An order form with instructions is located in the center of this Bulletin.

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Missouri Botanical Garden Bulletin

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May/June 1982

A Tour of the Spice Rack

CINNAMON
CLOVE
GARLIC
SAFFRON
NUTMEG
PEPPER
PAPRIKA
SESAME

The rack itself is walnut with four shelves, ten inches wide, two deep. A strip of beveled wood, a quarter-inch wide, runs along and about an inch above each shelf. This keeps the bottles from falling out of the rack, which is fastened to the kitchen wall.

There are six bottles on each shelf, 24 four-inch cylinders, each an inch-and-a-half in diameter. If you consider a bottle as you would a globe, the label on it reaches from approximately 38° north of the equator to 38° south of it, and, using St. Louis as a longitudinal center, reaches 53° east to 53° west of the City.

Each bottle is sealed with a white plastic cap screwed onto the glass.

And inside? Inside each bottle of crumpled leaves, bark quills, dried seed, powdered bulb is — what? The essential flavor of spaghetti, coffee cake, chili, soup, steak au poivre? Yes. As well as history, prayers, lies, hope, vision.

The bottles are lined there, on those shelves arranged alphabetically: Allspice, Basil, Bay Leaves, Cayenne, Chili Powder, Chives, on the top shelf; Cinnamon, Cloves, Coriander, Cumin, Dill, Garlic, on the next; Ginger, Mace, Nutmeg, Oregano, Paprika, Parsley, on the third; and, on the bottom, Pepper, Rosemary, Sage, Sesame Seed, Tarragon, Thyme. The labels tell us this much.

But select a bottle at random. Cinnamon — second shelf, first bottle. Unscrew the lid and draw out a single, brown, three-inch long, curled quill. Cover and replace the bottle. Scrape the quill with a fingernail to release the scent, and have a thought of coffee cake, hot cinnamon toast, and

In the Fifth Century B.C., the Arabs controlled the trade of cinnamon to the west, to Greece and Rome. To protect their market they were secretive about their source for the spice (the Orient) and "let slip" tales of its location and harvesting. Herodotus, the Greek historian we still remember more than 2300 years after his death, recorded one of these tales. Cinnamon, the traders revealed, grew in mountains inaccessible to man. Large winged creatures used the twigs to build nests which they fastened with mud to even more inaccessible cliffs. To get the spice, the traders left large pieces of donkey meat on the ground below. The winged creatures swooped down, retrieved the meat, and carried it to their nests, which were not strong enough to support the weight of the meat. The nests collapsed, showering the ground with the cinnamon twigs. The traders quickly collected the twigs and escaped before the creature could capture them. Such a difficult and uncertain harvest necessitated a considerable price.

In the First Century, A.D., Pliny the Elder pointed out that these stories were created by the Arabs to ensure their trade.

A dash of this: *Prior to becoming a prophet, Mohammed was a part owner of a spice shop in Mecca.*

But then, what to say about cinnamon here in St. Louis, 1900 years after Pliny disclosed the truth, about the quill you hold as you stand in your kitchen? That it probably is not the spice cinnamon, but cassia. Both spices are produced from the bark of evergreen trees of the same genus, *Cinnamomum,* but cinnamon is from the species *C. zeylanicum,* while cassia is from *C. cassia.* In 1938, the Food, Drug, and Cosmetic Act permitted the use of the name cinnamon for both spices; since then cassia has all but replaced cinnamon here. Cassia bark resembles the other but is coarser, thicker, and has a more intense aroma than cinnamon. Cassia powder is reddish-brown; cinnamon tan. When cinnamon is marketed, only the inner bark of the tree is sold. Cassia is the inner and outer bark of *C. cassia.*

A sprinkle of that: *The Medieval Crusaders who conquered the Middle East made spices available to Europeans at such low costs that even peasants were able to afford them. This new European spice trade contributed greatly to the prosperity of the Italian ports of Genoa, Pisa, and Venice, producing such great wealth that the Renaissance was possible; artists acquired support for their work. The great masters Michelangelo, Titian, and da Vinci were able to have sponsors.*

(continued on page 4)

Comment

In late March, I flew the length of Costa Rica in small planes and helicopters to attend the dedication of the Costa Rican portion of the International Friendship Park, a thousand square miles of jungle that straddles the boundary of Costa Rica and Panama towards the southern end of the Central American Isthmus. I was representing the Garden as well as the Organization for Tropical Studies, a 26-university association which includes Washington University and has been operating in research and graduate instruction in Costa Rica for some 20 years.

Costa Rica is a small country that is extraordinarily rich biologically, like the tropics in general. Although only a third the size of Missouri, it has over four times as many kinds of plants (more than 8,000 species), and they are much more poorly known. Half of the forests that were present there 30 years ago have been cut, most to create pastures to provide cheap beef for U.S. markets; pastures that subsequently lost their fertility and became unproductive.

Costa Rica is staunchly democratic and a close ally of the United States, a bulwark of friendship in troubled Central America. More than eight percent of its land has been set aside as national parks, the highest proportion of any country in the world. Outgoing President Rodrigo Carazo told me that he was especially proud of his administration's accomplishments in this area. Facing severe economic difficulties at present, Costa Rica badly needs our help. The Missouri Botanical Garden is contributing in an important way to an understanding of the natural resources of Costa Rica and of the tropics in general, and will continue to do so to the limit of available resources.

Peter H. Raven

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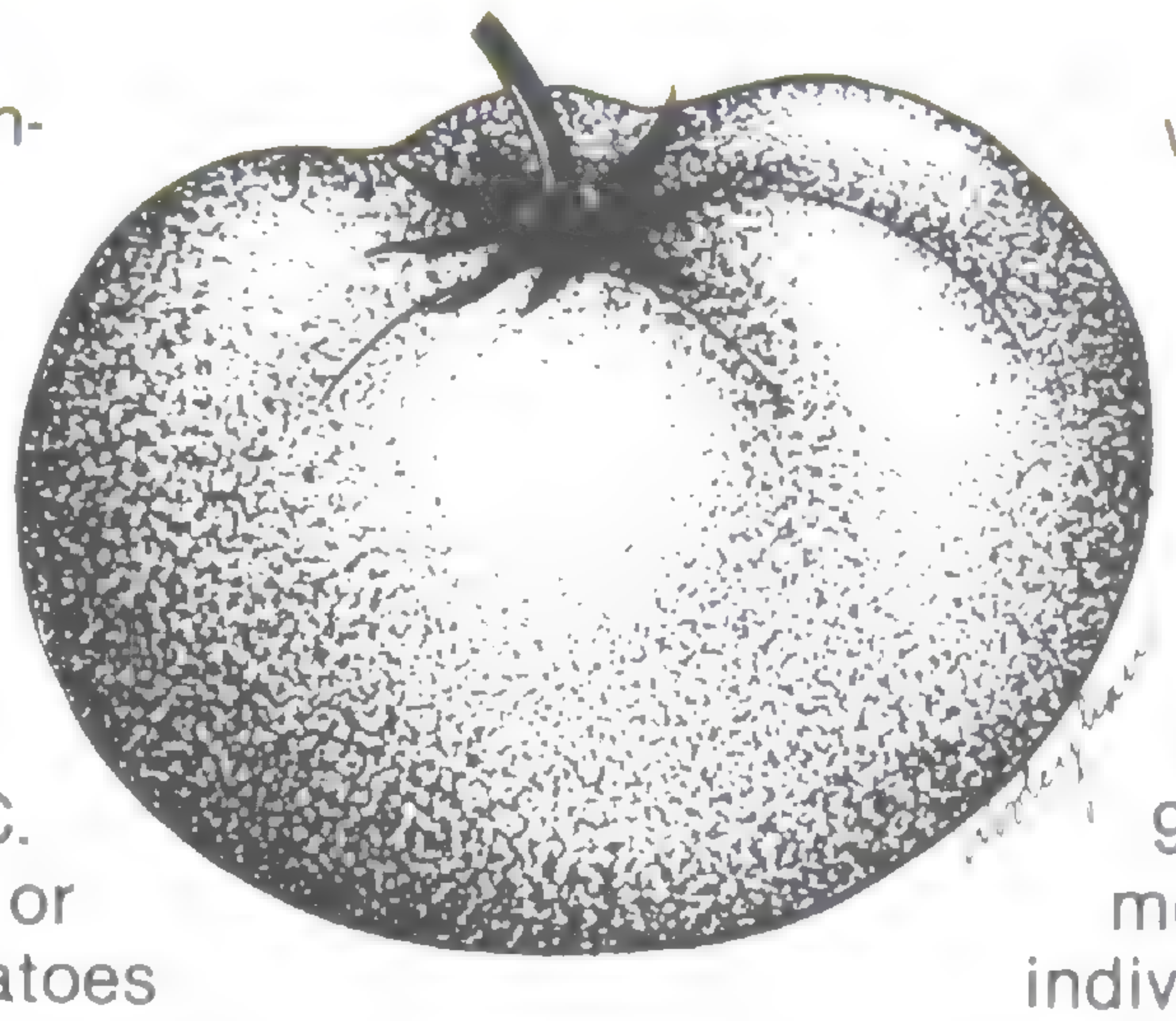
Gardening in St. Louis

It's Tomato Time



It is ironic that the tomato, once considered by American colonists as poisonous, is today's most popular vegetable (or more correctly, fruit).

Anyone who has sampled a fresh-from-the-garden bacon, lettuce and tomato sandwich knows why every gardener grows at least one tomato plant. In addition to being tasty, tomatoes are a good source of Vitamins A and C. They can be eaten raw, fried, broiled, or stuffed. Dieters can eat their fill of tomatoes since 3½ ounces of raw tomato contains only 22 calories.

When you buy tomato plants, look for disease-resistant varieties. Plants resistant to two fungal diseases which cause wilt, Fusarium and Verticillium, and to nematodes, very small eel-like creatures which enter and damage roots, are referred to as VFN hybrids.

Try several different varieties so you can see which ones grow best for you and which ones appeal to your taste buds. My favorite variety is Better Boy. It is disease-resistant and is a prolific producer in St. Louis.

Here are some tips on transplanting tomatoes:

1. Harden plants off for about a week before you plant. Do this by letting them get drier than normal between waterings and by placing them in a coldframe to acclimate them to outdoor temperatures and bright light intensity.

   Ask your garden supplier if he has done this before you buy them. Tomatoes which have not been hardened off will wilt dramatically after they have been exposed to full sunlight.

2. Transplant in the morning or early evening or during an overcast day. This gives the plant a chance to get "settled in" before the searing sun causes its leaves to become dehydrated. It is natural for newly transplanted tomatoes to wilt during the day. They should, however, regain their stiffness (called turgidity) during the evening.

3. Always water the plants thoroughly immediately after they have been planted.

4. If the plant is compact, sink it into the garden soil about 2 inches deeper than it was planted in the pot. If it is tall and leggy, the plant should be sunk 6 inches or more. The plant will quickly send roots out from this sunken stem.

5. Choose a sunny spot for your tomatoes. These plants are tropical, so they need much light and warmth in order to produce to their maximum.

6. Apply three to four pounds of 5-10-5 fertilizer per 100 square feet of growing space.

7. If your plants are purchased in compressed peat pots, be sure to rip off at least 1 inch of the edge of the pot and tear out the bottom. If you don't do this, the peat will dry and prevent the roots from penetrating it.

8. Mulch the plants with black plastic. This material retains moisture, prevents weed growth, and provides extra warmth which crops like tomato plants relish. Black plastic also will discourage visits from those unwanted garden pests, slugs.

   Organic mulches such as straw and leaves will retain moisture and prevent weed growth, but, unfortunately, they also create an ideal retreat for slugs and snails.

9. Stake your plants. Three methods are most commonly used: a. Staking each plant individually and continuously removing all side shoots or suckers; b. Growing on a trellis; c. Growing in a cage of concrete-reinforcing wire.

   The trellis and cages can be made of 10 gauge concrete-reinforcing wire (6 inch mesh) which has been treated with rust-proof paint or has been plastic coated. Make sure the gauge of the wire is heavy enough to support a fruit-laden vine. To make an 18 inch cage requires 5½ feet of wire.

Favorites

In this issue I have reprinted a list of some of the vegetable varieties which our staff horticulturists have chosen for their own gardens. These were selected for taste as well as for their ability to thrive in St. Louis. Most of these varieties are available in our Plant Shop.

Beans: Tender Crop (bush type), Burpee's Stringless Green Pod (bush), Kentucky Wonder (pole type), Fordhook 242 (lima beans); *Beets:* Detroit Dark Red; *Broccoli:* Green Comet, Premier; *Carrot:* Oxheart, Chantenay Red; *Cauliflower:* Early Snowball, Snow Crown; *Cabbage:* Golden Acre, Emerald Cross, Red Acre (Red Variety); *Corn (Sweet):* Honeycomb, Golden Cross Bantam Hybrid; *Cucumber:* Lucky Strike (pickling variety), Ashley, Straight Eight; *Eggplant:* Jersey King, Black Beauty; *Kale:* Dwarf Siberian, Blue Curled Scotch; *Lettuce:* Butter Crunch, Salad Bowl, Black Seeded Simpson; *Onion:* Yellow Utah, Yellow Sweet Spanish, Southport White Globe, Southport Red Globe; *Parsley:* Double Curled, Spartan Bonus; *Peas:* Sugar Snap Peas, Green Arrow, Little Marvel Peas, Sugar Mel; *Pepper:* California Wonder, Yolo Wonder, Bell Boy; *Potatoes (Irish):* Red Pontiac, Norgold Russet; *Potatoes (Sweet):* All Good, Centennial; *Radish:* Cherry Belle; *Rhubarb:* Victoria; *Spinach:* Bloomsdale-Longstanding, Melody; *Squash:* Early Whitebush Scallop, Early Butternut Hybrid, Gold Rush (Gold Zucchini); *Squash (Winter):* Table Queen (Acorn)-Vining Type, Butternut, Table King; *Tomatoes:* Avalanche, Beef Master, Better Boy, Roma (Pastel), Supreme, Golden Boy (Yellow Acid-Free Type); *Turnip:* Purple Top, White Globe.

–Steven A. Frowine, Chairman, Indoor Horticulture

The tomato, a member of the Solanaceae (potato) family, will be featured with other common and uncommon Solanaceae in an exhibit from July 31 to August 15. This will coincide with the Second International Symposium on the Biology and Taxonomy of the Solanaceae, August 3-6, which will bring 200 scientists from around the world here to discuss current research in this important plant family.

A Tour of the Spice Rack

(continued from page 1)

You replace the cinnamon and move your hand down the same shelf to the last bottle on the right. Garlic, dried and powdered. A clove on a string around the neck would keep vampires away, you recall from the black-and-white Bela Lugosi films.

When you open the bottle, sprinkle some into your open palm, and lift your hand to your nose and inhale, the aroma is not strong. The garlic needs to be rehydrated, simmered in butter; a thick spaghetti sauce perhaps.

Garlic, the spice, is the composite bulb of *Allium sativum;* onions and chives are also members of the *Allium* genus. The name, garlic, is from the Anglo-Saxon *gar,* a spear, and *leac,* a plant, and this name you understand if you see it growing, sometimes by a roadside where there was once a garden but there is no longer, but the garlic faithfully returns each year. If you find garlic on this roadside, stop, pull the bulb from the plant, and peel back the thin, whitish skin with a thumbnail, you can see several egg-shaped bulblets; these are the cloves. If you separate one of these cloves from the bulb, dig your nail into it, your finger will smell of garlic long after; even after washing the scent is there, in spite of the soap's perfume.

This garlic, the dried powder from the bottle or the clove you have cut with your nail, was the first spice of which we have record. During the building of the Great Pyramids of Cheops, the 100,000 laborers who worked in the construction were fed onions and garlic as medicinal herbs to preserve their health and strength.

Even today there is hope of health in this spice. In 1981, a Chinese physician reported to an international conference that garlic may prevent stomach cancer. He disclosed a study of residents of two neighboring Chinese areas who lived similar lives save for a single difference in diet: one group consumed 20 grams of fresh garlic each day; the other, none if any. The annual death rate from stomach cancer was eleven times higher in the second area. The physician suggested that garlic prevented bodily bacteria from converting nitrates into carcinogenic nitrosamines.

A pinch: *In the late Middle Ages, certain Oriental spices were extremely expensive. A pound of saffron cost the same as did a horse; a pound of ginger would buy a single sheep; two pounds of mace, a cow. A 1393 German price list has the price for a pound of nutmeg being seven fat oxen.*

After garlic, choose the nutmeg, essential to Christmas eggnog; topping for custard. No, take the mace from the shelf as well. The nutmegs are inch-long seeds, ovoid: the shape and color of chocolate eggs. Mace is a light brown powder. Like the cinnamon quill, you must grate the nutmeg to have its scent; the mace has a stronger aroma.

Both spices come from the *Myristica fragrans,* the nutmeg tree. Nutmeg is the seed; mace is the dried, ground aril — the scarlet, net-like covering of the nutmeg. Until the 17th Century, when the use of sugar increased, making the use of strong spices less necessary, mace was more popular than nutmeg. Today, their positions are reversed.

The nutmeg tree is an evergreen that reaches 40 to 60 feet in cultivation. It does not usually bear until its seventh year, and when it does, the yield is about 10 pounds of nutmeg and a pound and a half of mace. The tree will bear for about 70 years.

Grate: *In the 17th Century, the Dutch controlled the commerce of nutmeg and mace, which came from the Moluccas (Spice Islands). Because mace sold for a higher price than did nutmeg, a colonial administrator, ignorant of botany, ordered that more mace and fewer nutmeg trees be planted.*

And then to the pepper; wrinkled, black balls that are the shriveled, dried berries of the *Piper nigrum;* no relative of the bell peppers, the green, the chili, the paprika, which are of the genus *Capsicum.* How much pepper do we consume; how often do we pour the corns into the mill and sprinkle the powder over potato, steak, roast beef, chicken? This spice, so common we do not count it a spice with the chives, cloves, ginger, accounts for one-fourth of the world spice trade. So common — yet consider that in 408 A.D. it was worth its weight in silver; that in the 13th Century peppercorns, counted one by one, were legal tener for taxes, tolls, and rents; that in that same century, if a man dropped a single corn to the floor, he hunted it as a lost pearl.

P. nigrum is an evergreen, climbing vine native to the coast of southwestern India. From this vine come both white and black pepper. Black pepper is produced when unripened berries are harvested and dried in the sun; white when the berries are vine ripened, picked, soaked to remove the outer flesh, and the inner corn dried. Black is more pungent because of the outer flesh; we of the United States import eleven times more black than white. Our first millionaire, Elihu Yale (namesake of the university) made most of his fortune in trading pepper.

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1 Tb: *Pound for pound, paprika contains more Vitamin C than do citrus fruits. In 1937, Dr. Albert Szent-Gyorgyi, a Hungarian-born U.S. citizen, received the Nobel Prize in Medicine for isolating the vitamin in paprika pods.*

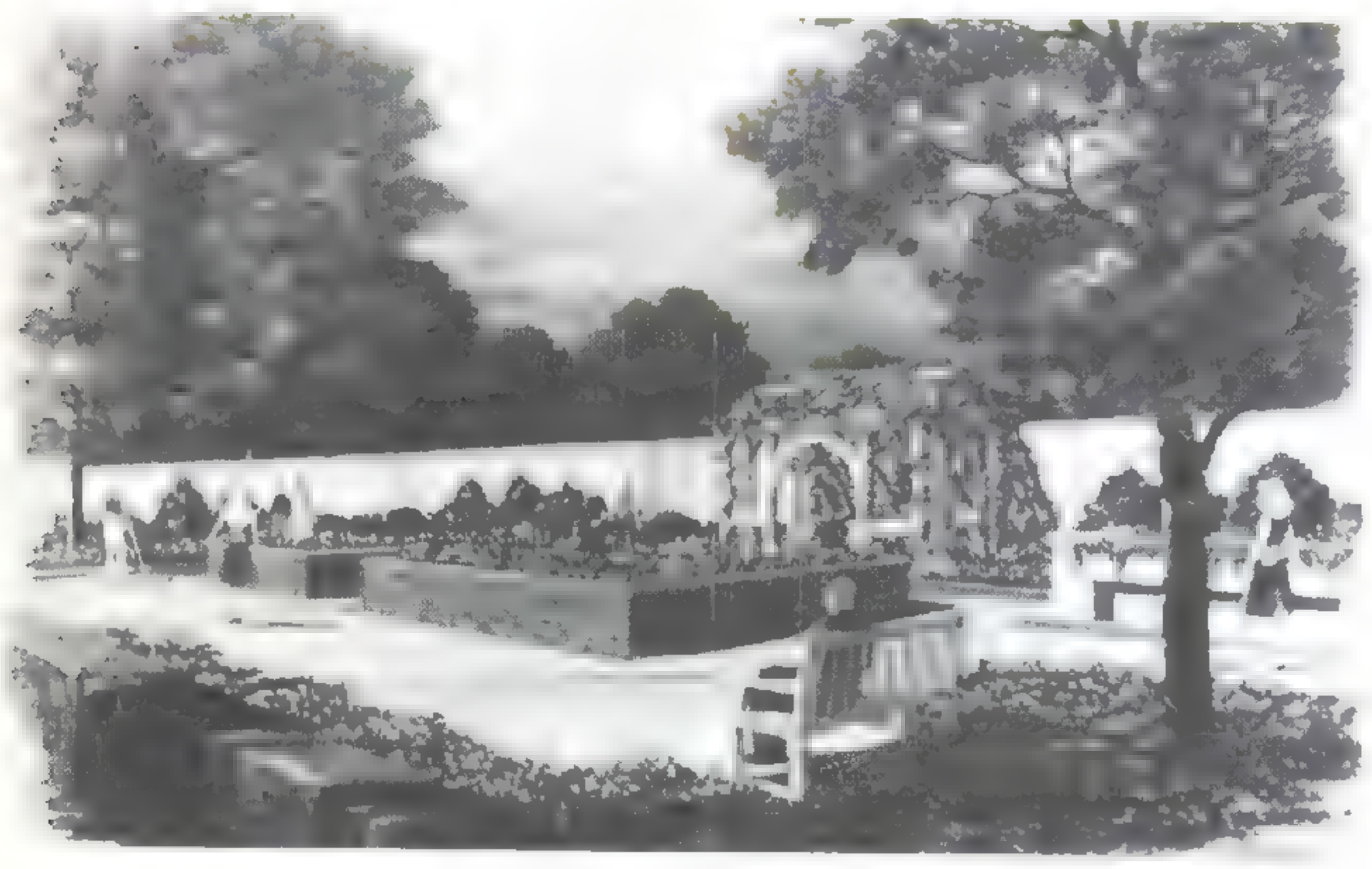
And here, between the sage and tarragon, the innocuous sesame seed, sprinkled topping for bagels, breads, buns, and rolls. What is the net weight of the bottle's contents? Two ounces, perhaps. Each year the world's production is that two ounces times 32 billion: four billion pounds of seed from the *Sesamum indicum,* a three-foot high annual indigenous to Indonesia and tropical Africa; the flowers are one inch long, pale rose or white trumpets. Most of this four billion pounds is produced for sesame oil — each seed contains about 50% of this oil, an important source of polyunsaturated fat, manufactured for use in margarine and salad and cooking oils. The seeds in the bottle on the rack have had the oil expressed from them, and it is not until they are toasted on top of the bread or roll that they will have their nutty flavor.

Yet this common seed, lauded in fast food jingles, once cost the average Persian laborer (Fifth Century B.C.) two month's pay for a single bushel. The early Assyrians believed that the gods drank sesame wine to prepare for creating the earth.

The command, "Open Sesame," which opened the treasure cave to Ali Baba, is a reference to the sesame seed — when they are ripe, the seeds burst from their pods suddenly, with a sharp pop. This may be the oldest condiment known; there is a drawing on a 4000 year-old Egyptian tomb of a baker adding sesame seeds to bread.

For news relative to herbs and spices, see page 12.

Ridgway News



For All The Senses

Here you could sit for hours on a late-spring afternoon with your eyes closed and know full well what surrounded you: the scents are there, the bayberry, lilacs, magnolia. The mint is unmistakable; and there is thyme and basil and sage, as well roses and hyacinth.

This is the Scented Garden, now open, now found near the Linnean House. It is considerably expanded from its former location southwest of the Main Gate. "Before, it was limited to raised bin planters," Alan Godlewski, Chairman of Landscape Horticulture, said. "Here we have additional plants that are remarkable for scent. Small trees and shrubbery will be an important part of the design. We want to pique different senses other than sight. This area will be unique in that we want to encourage visitors to touch some of the plants."

There are signs in the garden, printed and in braille, which suggest that visitors smell or touch a specific plant.

"This Scented Garden also has a shell fountain; this is to pique one's sense and awareness of sound," Godlewski said.

"The garden has been designed to be accessible for visitors who are visually impaired or handicapped. But all visitors are encouraged to heighten their awareness by visiting it."

Its creation was possible through a gift of Isabelle Lowis Zimmerman in memory of her grandmother, Susannah F. Mack, and her mother, Lilliam C. Lowis.

Swift Family Garden

One of four gardens in progress near the Linnean House is the John S. Swift Family Garden, which will be found between the entrance to the Linnean House and the Gladney Rose Garden. In addition to the three pools previously there, a fourth pool has been constructed. The Swift Family Garden will also feature a wooden arbor with a vine display (wisteria and clematis), a perennial border (peonies, asters, stachys), and pygmy date palms displayed in wooden planters during the summers. "Although new, and designed as part of our Master Plan, this garden, and those around it, will be in keeping with the Victorian style set by the Linnean House," Pat Rich, Special Assistant to the Director, said. "Our Master Plan plays on the Garden's sense of tradition, but at the same looks to the future.

The John S. Swift Family Garden is a gift of the John S. Swift Company, Inc. Charitable Trust.

Jordan Wing to Have Atrium

Part of the Jordan Education Wing of the Ridgway Center will be an atrium, named for Eugenia U. and James A. Maritz.

Describing the 2-story, 360 square foot atrium, Steve Frowine, Chairman of Indoor Horticulture said, "It will provide a beautiful garden area that is also extremely educational. We will use the atrium for a revolving display of plants which relate to specific educational programs or which allow visitors to see some of our smaller collections that we ordinarily do not exhibit.

"Some of these exhibits might be of unusual tropical plants, orchids, bromeliads, gesneriads, ferns, and begonias. For example, we may feature an exhibit of all the known varieties of lady slipper orchids found in Malaysia, or bromeliads that possess certain color patterns. We could present an exhibit of a particular genus of bromeliads which has a lot of variation from species to species."

The Maritz Atrium was made possible through a gift of Mrs. Wells A. Hobler, James A. Maritz, Jr., William E. Maritz, and Maritz, Inc.

Workers erected the north fan wall of the Ridgway Center in early spring.

The Hitchcock Family: 93 Years of Service to the Garden and the Community

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HENRY HITCHCOCK
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1982

Less than a month after Henry Shaw's death, a prominent local attorney named Henry Hitchcock (1829-1902) was elected Vice-President of the newly formed Board of Trustees of the Missouri Botanical Garden. This established a link between the Hitchcock family and the Garden that has lasted three generations and is now in its tenth decade.

A descendant of Revolutionary War hero Ethan Allen, Henry Hitchcock came to St. Louis in 1861 to establish his law practice, and soon became an assistant editor of the *St. Louis Intelligence.* Later in life he served on the Board of Washington University, and was instrumental in establishing the American Bar Association and the St. Louis University Law School. At the time of his election to the Garden's Board, he was also serving as president of the American Bar Association.

After his death in 1902, his son George C. Hitchcock (1867-1949), also an attorney, was elected to the Garden's Board in 1903, and later served as president of the Board from 1928 to 1947. He was a founder of St. Louis Country Day School and was active in governing the Mercantile Library and the Jefferson National Expansion Memorial Association. He retired from the Garden's Board in 1947.

Recognizing the contributions of the Hitchcock family, the Board of Trustees elected George's son, Henry Hitchcock, to fill the vacancy created by his father's departure. Henry Hitchcock, in turn, served as President of the Garden's Board from 1963-67. In 1973, he resigned from active membership of the Board, but continues to serve the Garden in his current capacity as an honorary trustee.

The Hitchcock family has served the Garden for nearly a century, and has been involved in most of the Garden's growth and development during the time from Shaw's era to the present. In recognition of these contributions, an office in the Ridgway Center is being dedicated to these three prominent members of the Hitchcock family.

—James R. Reed, Librarian

A Conference in Africa

At the recent meeting of the Association pour l'Etude Taxonomique de la Flore Africaine Tropicale, usually simply abbreviated AETFAT, in Pretoria, South Africa, the Garden was elected the location of the next Secretariat and Dr. Peter Goldblatt, B. A. Krukoff Curator of African Botany, elected Secretary-General. AETFAT was formed in 1951 to promote the study of the flora of tropical Africa through holding periodic meetings, publishing various works, and accumulating a library on African botany which its members can use. The Association now has over 600 members. The next meeting will be at the Garden in 1985, and the fact that the Garden was elected the next Secretariat reflects the international importance of our African plant collection and the programs of research in African flora.

The Garden is the North American repository for African collections; scientists collecting in Africa know that they can deposit their specimens in the Garden's herbarium for the greatest amount of subsequent exposure and use. Approximately ten per cent of the three million specimens in the herbarium are from Africa.

The week-long Pretoria meeting was attended by about 250 botanists and was highlighted by the keynote address by Dr. Peter Raven at the opening session. Dr. Raven's talk provided background for the symposium on the "Origin and Evolution of the African Flora" which followed. Speakers at the symposium reviewed the changes in the African flora since the beginnings of life on that continent several billion years ago. The Pretoria meeting was hosted by the Botanical Research Institute, a division of the South African Ministry of Agriculture and received widespread industrial support and radio/television coverage.

— Marshall R. Crosby, Director of Research

Priestley Award to Dr. Raven

Dr. Peter H. Raven, Director of Missouri Botanical Garden, was the 1982 recipient of the Joseph Priestley Award from Dickenson College, Carlisle, Pennsylvania. The award, named for the 18th Century scientist/theologian who discovered the element oxygen, has been presented annually by the college since 1952 to "a distinguished scientist in recognition of his or her discoveries or contributions to the welfare of mankind." Previous recipients include Linus C. Pauling, Margaret Mead, Edward Teller, Carl Sagan, and nine Nobel laureates.

Raven was recognized by the college for his work in calling public attention to the necessity of studying the tropics before they vanish through deforestation and exploitation.

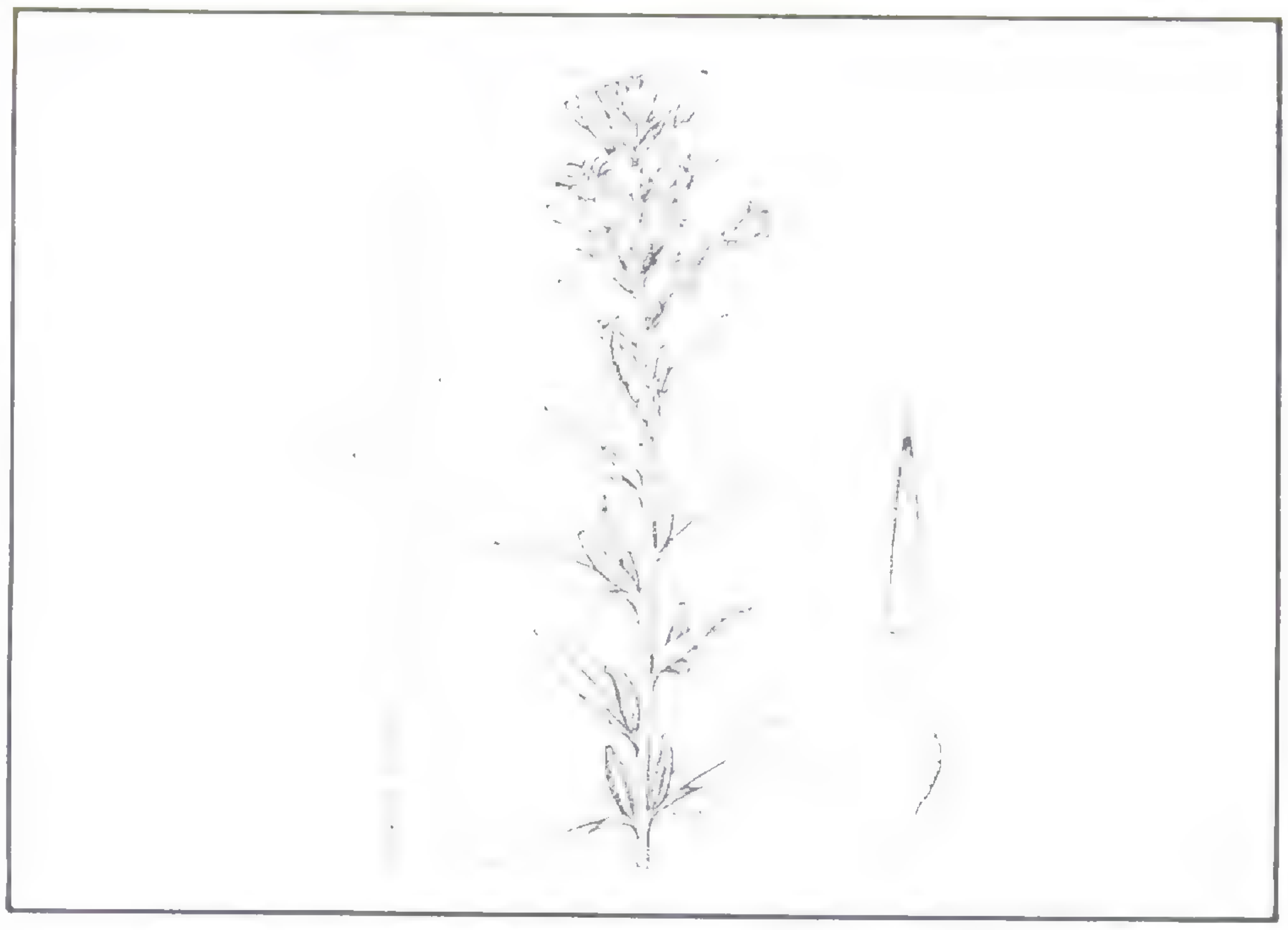
Dickenson College was founded in 1783 and is named for John Dickenson a drafter of the Articles of Confederaton.

Wonder Drug from a Common Weed

The idea that a common roadside weed might contain an essential nutrient absent from our rich and varied modern-day diet seems, at first, unlikely. The idea that a deficiency of this one nutrient might be implicated in a wide range of serious illnesses, including heart disease and arthritis, borders on the absurd. Yet the tremendous amount of research, mainly in Europe and Canada, that is now being directed at the common evening primrose *(Oenothera)* and its oil-bearing seeds seems to confirm these remarkable ideas, and to offer new hope in the treatment of various diseases. *(Oenothera* is a genus of plants primarily found in the Western Hemisphere, with the greatest concentration of species being in North America. Several species are common locally.)

What is this marvelous substance found in the heretofore lowly evening primrose? The substance is gamma-linolenic acid (GLA), one of a group of vitamin-like essential fatty acids, which otherwise is found in a rich natural supply only in human milk. These essential fatty acids (called essential because they are not manufactured by the body and so must be supplied by food) are crucial not only as a major component of the membranes which surround all cells in the body, but also as precursors of prostaglandins, hormone-like substances that are produced in virtually all cells. Prostaglandins regulate much of the body's normal metabolic functioning, and deficiencies in them have been implicated in various disorders. One of the most influential prostaglandins is PGE1, which does several highly desirable things: lowers cholesterol levels, reduces blood pressure, inhibits thrombosis, and inhibits inflammation, including that associated with arthritis. The maintenance of adequate levels of PGE1 is therefore of great importance to many body functions, and it can only be maintained by a dependable supply of GLA, an essential precursor to PGE1.

Research indicates not only that some people are genetically deficient in the enzyme which produces GLA from simpler, commonly occurring unsaturated fats, but also, more significantly, that the enzyme is easily inhibited by substances common in most people's diets. The inhibitors include saturated fats, certain unsaturated fats that have been highly processed (as in many processed vegetable oils and margarine), and alcohol. Because GLA is rare in most diets, and inhibited in many others, the discovery of large quantities in oil of the seeds of evening primrose is very exciting news indeed. Research currently underway suggests that this oil may be of use in the treatment of heart disease, arthritis, eczema, multiple sclerosis, hyperactivity, alcoholism, and obesity. It has even been touted in the popular press as an effective cure for hangovers.

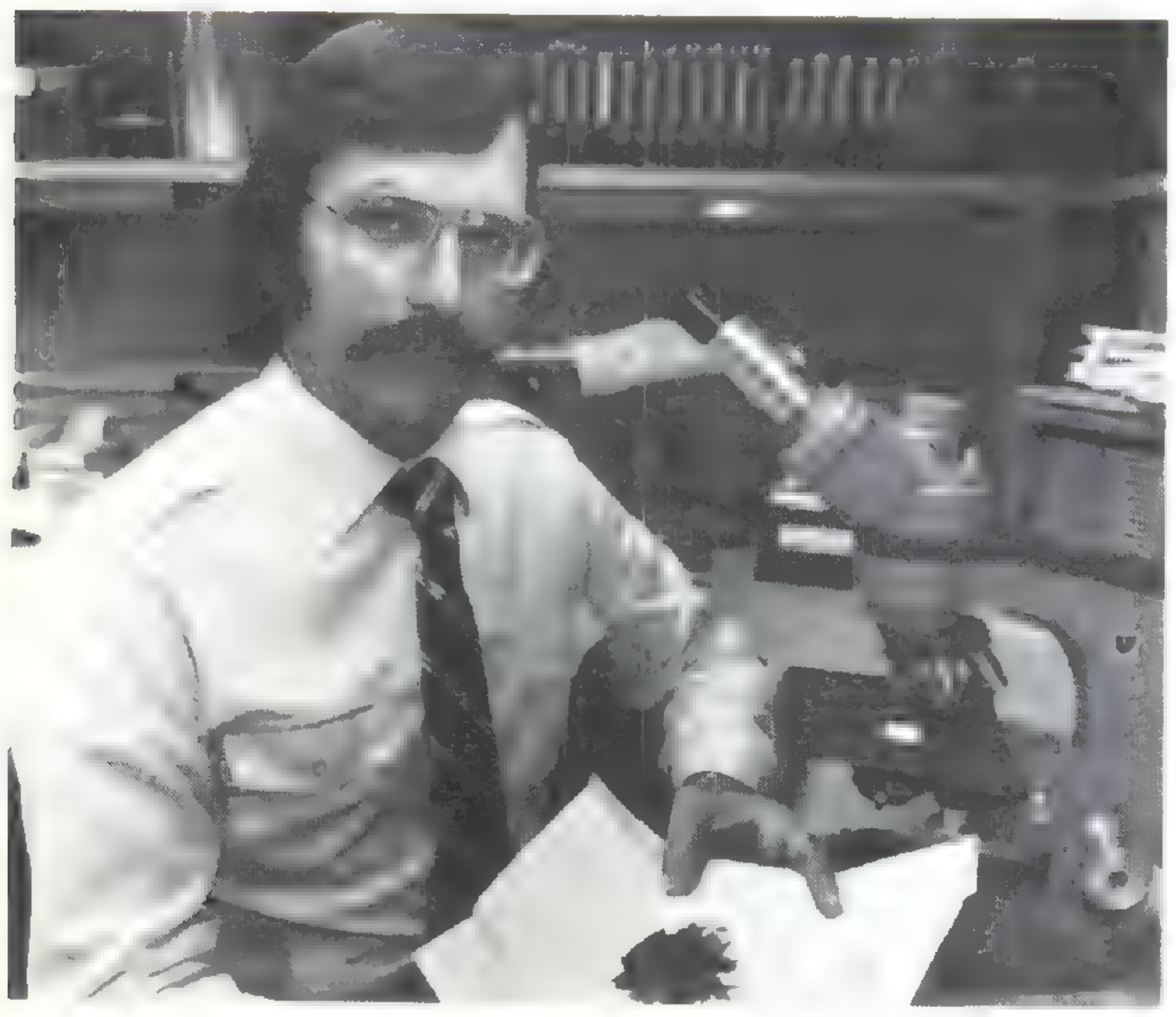


The evening primrose is of more than passing interest to researchers here at the Missouri Botanical Garden. Dr. Peter H. Raven, Director of the Garden, has studied these plants in depth for some twenty years, currently with Dr. Warren L. Wagner, a recent graduate of Washington University. Their research, some in collaboration with scientists at the University of Düsseldorf in Germany, has clearly established the classification of the species, and vastly increased our understanding of the genetic and evolutionary relationships of the plants. Their work has interested both clinical researchers anxious to learn more about the promising therapeutic effects of this plant, and those attempting to breed new strains of these wild plants for the commercial production of the oil they contain.

The discovery of this new wonder drug in a common weed demonstrates not only the potential benefits we can gain from studying even inconspicuous plants, but also how seemingly "academic" research often yields unexpected and momentous results.

—Peter C. Hoch, Warren L. Wagner, Research Associates

Notes from the Garden



Dr. Robert E. Magill has joined the Garden staff as Assistant Curator of Bryophytes in the Herbarium. He received his Ph.D. from Texas A & M University in 1975 and then spent a postdoctoral year at the Garden under a National Endowment for the Arts museum trainee program. From 1976 through 1981 he was on the staff of the Botanical Research Institute, Pretoria, South Africa, writing a moss flora of southern Africa, the first of four volumes of which has just been published . . . .

ECO-ACT, environmental leadership program, is recruiting students for the 1982-3 school year. Two three-week summer sessions provide students with active and direct experiences in learning. During the school year, students teach environmental concepts to grade school children.

High school students who are interested in learning more about St. Louis and in developing their skills as leaders, may contact David Wilson, 577-5142, for information about ECO-ACT. . . . .

Notes from the Garden

7-Up to Sponsor Japanese Festival

The 1982 Japanese Festival, June 19-27, will be sponsored by The Seven-Up Company. Approximately 50,000 visitors are expected for the nine-day festival.

The popular Taiko Drummers of San Francisco will return once again.

New attractions for this year's Festival include Japanese master kite-maker Atsushi Moriyasu who is credited with creating the world's smallest kite — less than 1/4 inch-square (ideal flying conditions for it are over the rising air of a charcoal fire). The Bob Kramer Marionettes will also perform.

On Saturday, June 26, the Garden will be open until 10 p.m. to allow visitors to see the Japanese Garden after dark, lit by candles in the stone lanterns. On other days, the hours are 9 a.m.-7:30 p.m.

On the two Festival week-ends, the admission fee will be slightly higher than usual; Members will be charged $1. . . . .

A photography contest will be conducted during the Festival, with prizes awarded to the best prints of the Festival. Further details will be announced in the newspapers. . . . . . .

The 1982 Japanese Festival offers you a chance to win a superb, new Datsun, donated by the Greater St. Louis area Datsun Dealers. . . . .

The Linnean House is 100 years old; the Garden will celebrate the centennial of this, the oldest greenhouse west of the Allegheny Mountains, on May 8, with festivities conducted throughout the day in conjunction with the Swedish Council of St. Louis. This celebration will be one of the major events of National Historic Preservation Week in the area.

Built in 1882 by Garden founder Henry Shaw, the house was dedicated by him to honor the great Swedish scientist Carl Linnaeus, who devised the system of classification of plants and animals used today (the latin, Linnaean names). Shaw used the building as an orangery — a place to store, during the colder seasons, potted plants which cannot survive freezing temperatures. Early in this century, the building was converted to a display greenhouse and today the Garden's collection of camellias occupy the house.. . . . .

CALLIGRAPHY EXHIBITION

The second annual exhibit of work by members of the St. Louis Calligraphy Guild is scheduled for May 4-27 in the John S. Lehmann Building. Containing approximately 40 books, posters and broadsides, the exhibit displays the art of long-time, professional graphic designers as well as that of novice calligraphers. The Guild was founded in 1980 to promote the art of calligraphy through education, lectures, and films. For further information about the exhibit or the Guild, call 621-8609 or 576-6918. . . . .

The Tower Grove House Tea Room is open for luncheon on Tuesdays and Thursdays, 11:30 a.m.-1:00 p.m. Reservations are necessary and may be made by calling 577-5150 by noon on the day before your luncheon.. . . . .

If you have had a hectic day, take an hour or so to visit the Garden. Beginning May 1, it will be open from 9 a.m. to 7:30 p.m. The display greenhouses, shops, restaurant, and Tower Grove House will be open 10 a.m.-7:30 p.m.

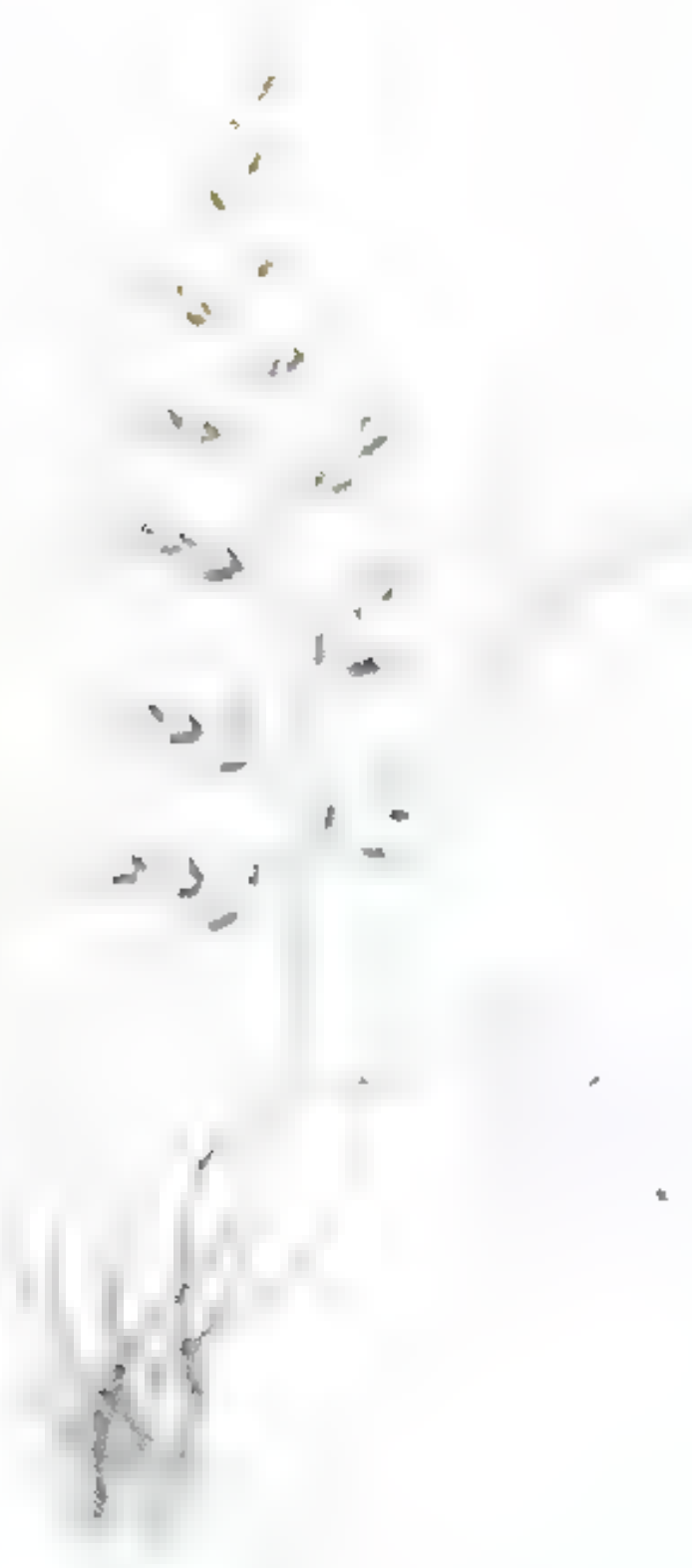
Effective May 1, the annual fees for three levels of Membership will increase. Regular Memberships will be $30 annually, Contributing Memberships will be $60, and Sustaining Memberships, $125. Sponsoring, Directors Associate, and Henry Shaw Associate membership fees will not be increased. The organizational Membership category will be discontinued. . . . .

A moving sale will be held in the Garden Gate Shop, June 1-14, 10 a.m. to 7:30 p.m. The Shop will be moving to the Ridgway Center in July. Members are invited to take advantage of discounts of 25%-50% during the two-week sale. (No additional Membership discount will be offered.)

Rose Evening for this year is June 4, from 6 p.m. to 8 p.m. Members are invited to stroll the two rose gardens (the Anne L. Lehmann and Gladney gardens). Refreshments will be served. The evening will feature the dedication of the Isabelle Schwerdtman Carillon which was installed in Tower Grove House last December. A carillon concert is planned. . . . .

Beginning on Rose Evening, Members and the public will have the opportunity to order roses from the Garden, selecting from among 30 varieties displayed in the Lehmann and Gladney rose gardens. Order forms with instructions will be available beginning June 4, and roses ordered will be delivered in March, 1983.. . . . . .

Shaw Arboretum's Visitor Center will operate on its summer schedule beginning Sunday, June 11. From then until August 29, it will be open on Monday through Friday, from 9 a.m. to 4 p.m. It is closed on weekends. The Visitor Center provides maps and information about the Arboretum; it also contains a small gift and book shop. When the Center is closed, maps, information brochures, and registration envelopes are available at the door. The staff invites members and other visitors to stop into or call the Center at 577-5138 for information, suggestions, or assistance.. . . . .



Sarah Frances Price was a nineteenth century botanist, educator, and illustrator. She built a herbarium of approximately 2,000 plants of the American south; about half of these she reproduced in pencil and watercolor sketches. She also sketched and painted numerous insects and birds native to Kentucky, where she lived. For her botanical illustration she was honored at the 1893 World's Fair in Chicago. The author of one major work *(The Fern Collector's Handbook,* 1897) and several papers on the flora of Kentucky, she was also the discoverer of several new species of Aster, Dogwood, Clematis, and Wood Sorrel.

On her death in 1903, her illustrations and herbarium specimens were given to the Garden by her sister Mary Price. Approximately forty of these specimens, sketches, and paintings will be exhibited in the John S. Lehmann Library from May 3 until 28, Monday through Friday, 9 a.m.–5 p.m.

Members of the Garden are invited to join a special tour to New England coastal towns, September 13-19, 1982. Led by Steven A. Frowine, the Garden's Chairman of Indoor Horticulture, the tour will visit Boston, Plymouth, Glouchester, and Martha's Vinyard, as well as other historic towns, museums, and gardens. Because of personal connections of the tour leader, participants will be able to enjoy two rare tours: one of a private garden estate outside of Boston, the other a special tour of Arnold Arboretum led by that institution's Superintendant of Living Collections. A brochure with details has been mailed to all Members. For further information, call the Office of the Members, 577-5118, or the tour agent, Martha Jones of Sante Travel, 726-3040. . . . .

A Purple Martin Evening has been scheduled for June 3 at 6:30 p.m. Including a brief lecture, outdoor viewing session, and a wine and cheese reception, the event is in response to interest generated last year for the work of W. Ashley Gray III, volunteer Curator of Purple Martins. In 1981, his efforts resulted in attracting several pairs of the robin-sized, dark purple birds to the Garden. Purple martins are known for their acrobatic flying and insatiable mosquito appetites. J. L. Wade, a world-renowned authority on purple martins has been invited to speak on June 3. . . . .

The next Guide Training Program will begin on Wednesday, September 15, 1982, for eight consecutive weeks from 9:30 a.m. until 2:00 p.m. Graduates of the course are expected to conduct two tours on a given day of the week and to attend a Guide enrichment program on the second Tuesday of each month.

If you are interested in becoming part of this active group, please call one of the Guide Training Co-chairmen, Mary Jane Kirtz (316-1200) or Joanne Fogarty (961-2062) or the Education Office (577-5140). . . . .

Applications for Fall Festival booths are now available. Please send a self-addressed, stamped envelope to: Fall Festival Committee, Missouri Botanical Garden, P.O. Box 299, St. Louis, Missouri 63166. This Festival, the first of what is planned to be an annual event, is an opportunity for Members and others to demonstrate and sell their hobbies and crafts. It will be held in the new Ridgway Center, October 8-10. . . . .

Garden Director Peter H. Raven recently was elected to the Committee for Research and Exploration of the National Geographic Society. The Committee meets monthly to review applications to the Society for research funding. The Society, which publishes *National Geographic,* was founded in 1888. Its Committee for Research and Exploration was officially established in 1902, although the Society's work in this area began in 1890. . . . .

Architecture News, published by the School of Architecture of Washington University, included an article about the design and construction of the Climatron in its February, 1982, issue (Volume 1, Number 1). The article characterized the geodesic-dome greenhouse as "a design that reshaped St. Louis architecture." . . . .

Gary Jackoway

Five prizes and eight honorable mentions were awarded in the second annual winter photography contest. For the best overall print of the Japanese Garden, Nancy Gabianelli received a Tokina zoom lens, courtesy of St. Louis Photo. Forty dollar gift certificates for merchandise from St. Louis Photo were awarded to Linda Yust (color) and Gary Jackoway (black and white) in the Senior Division, and Steve Dunsford (color) and Randal Shryock (black and white) in the Junior Division. The honorable mentions, who received copies of the 1981 Garden calendar autographed by photographer Jack Jennings, were Carolyn Brooks, Richard Nesslein, Arthur Scherle, Joni Doyle, Linda Yust, Richard Murphy, and James Kladney, all of the Senior Division. James Platzer received an honorable mention in the Junior Division.. . . . . .

For Younger Members

Some Interesting Facts: Some Interesting Classes

- Fact: Can you solve this riddle:
Without them there would be no
seeds
Nor fruits to pick from nearby trees;
Their pollen sometimes makes us
sneeze
But think how much it does for bees.
What are they? *Flowers.*

- Fact: Where do pickles come from? *Cucumbers.*

Would you ever eat a root or stem? *Yes, for example, carrots, beets, asparagus.*

- Fact: American Indians used plants of the desert southwest to: derive calcium (from ashes of a burned plant), keep a diary (carved on a stick), make bricks (from mud and straw).

- Fact: The cattail was used by our ancesters as stuffing for pillows and mattresses; they also ground it for flour.

- Fact: The Japanese came to grow irises on their thatched roofs because of a famine. During that famine, no one was permitted to grow any plants that couldn't be used for food. Until then, irises were a luxury for the women because they supplied white powder the women used on their faces. The women insisted that if they were to starve, they wanted their white powder so they could look pretty. They then began growing them on the thatched rooves.

- Fact: In driving a car with a combustible engine, 20,000 gallons of oxygen will be consumed in one hour of highway driving. If there are 150,000 office workers in St. Louis who commute an average of 30 minutes each day, figure how much oxygen is consumed each day just by these commuters.

Three billion (3,000,000,000) gallons are consumed.

- Classes: The Education Department has designed a series of summer programs for students of ages 4-17. The courses included are: Fun with Flowers (ages 4-6); Pea Pods, Peppers and More (4-6); Desert Indians and their Plants (7-10); Earth Odyssey (7-14); All About Flowers (9-12); Creating an Edible Flower Arrangement (9-12); A Touch of Japan (10-12); Early Ozark Pioneers (10-15); ECO-Reach (part of the Garden's ECO-ACT program) (11-14); and For Teenage Shutterbugs (13-17) . Information or a descriptive brochure may be acquired by calling 577-5140.

—Ann Haley-Oliphant, Ilene Follman
Education Department

New Members

February & March 1982

Sustaining Members

Mr. John H. Biggs
Ms. Elizabeth L. Green
Mr. & Mrs. David E. Horn
Mr. & Mrs. B. A. Kroen
Mr. Frank J. Matula
Mr. & Mrs. Hugh S. Mosher
Mr. & Mrs. Robert G. Scheibe
Mr. & Mrs. Roger D. Smith
Mr. & Mrs. Wm. T. Thompson

Contributing Members

Mr. Kenneth A. Baker
Mrs. E. O. Bechtold
Ms. Leona J. Beckmann
Mr. & Ms. Albert M. Bennett
Mr. & Mrs. Wm. H. Biedenstein
Dr. & Mrs. J. F. Brunner
Mr. & Mrs. Louis Buchhold, Jr
Mr. Gerald L. Chandler
Claymont Garden Club
Miss Mary J. Davis
Mr. & Mrs. Larry Deutsch
Ms. Susan M. Dickens
Miss Dorothy C. Dieckman
Ms. Diane DuBois
Mr. & Mrs. Robert H. Duesenberg
Mrs. Henry P. Duncker
Mr. Felton Earls
Ms. Nan D. Earnheart
Mr. & Mrs. Bernard Edison
Mr. & Mrs. John Ellis
Mr. & Mrs. Allen G. Erdman
Mr. & Mrs. F. C. Ernest
Mrs. Rosemary Flance
Mr. & Mrs. Donald R. Franz
Mr. Terry W. Francis
Mr. & Mrs. Steve Frates
Mr. & Mrs. Ray H. Freeark
Dr. & Mrs. John Fries
Mr. Lewis A. Goldstein

Books

A World Seldom Seen

Rain Forests and Cloud Forests, Photography by Kjell Sandved; Text by Michael Emsley. Abrams, 1979. (Cloth $22.95, reduced from $45)

Rain Forests and Cloud Forests is a rare book, humbling you in the presence of the absolute beauty and wonder of nature. This over-size Abrams work brings you a seldom-seen world through the glorious photographs of Kjell Sandved, the renowned photographer for the Smithsonian Institute, and the clear, exciting prose of Michael Emsley.

In photographs often measuring 13½ × 20 inches, fern spores become alien, butterflies masquerade as spiders, and sunsets engulf you. They give you the story of the plants and animals that live and die in some of the earth's most mysterious regions.

"Forests precede peoples and nations; deserts succeed them," warned Chateaubriand 150 years ago. Emsley and Sandved show us why this must not be allowed to happen.

(Editor's note: The wall mural of the Ridgway Center's Gardenview Restaurant contains approximately 25 photographs by Sandved; this represents more than one-third of the entire mural, which consists of 72 photographs. Many of these by Sandved are included in this book.)

Help with the Vegetables

The Home Vegetable Garden: A Handbook, Brooklyn Botanic Garden, 1972 (Paper $2.25)

The Brooklyn Botanic Garden (BBG) seems to have a booklet on almost every garden-related topic and vegetables are no exception. In a concise, readable, and easy-to-use format, the authors approach the subject from many angles. Sure they'll help you raise asparagus and onions, but they also discuss growing watercress and girasole. Whether pests are a problem or your rototiller won't start, this BBG book can help. Garden plans and a planting chart for more than 40 vegetables are included. Of course, this one volume doesn't have all the answers. If you need help with soils or garden statuary, fruit trees or mulches, you'll have to consult one of the 60-plus other BBG books available.

—Judy Cuddihee, Garden Gate Shop

(Ms. Cuddihee is a buyer of books for the Garden Gate Shop. She welcomes suggestions from Members regarding books for the shop. All books mentioned in this column are available in the shop.)

New Members — *continued*

Mr. & Ms. John C. Govreau
Dr. & Mrs. M. W. Grimm
Mr. & Mrs. David J. Hagen
Mr. & Mrs. E. E. Hale
Ms. E. Halpin
Mr. & Mrs. Robert Haltenhof
Dr. & Mrs. Homer H. Hanson
Mrs. T. J. Hartrich
Miss Dorothy E. Hermann
Mr. & Mrs. Harold J. Hilliard
Mrs. Billie Hirsch
Mrs. James Holsen
Mr. & Mrs. Geo. N. Hosack
Mr. & Mrs. Thomas D. Hubert
Mr. & Mrs. James W. Huck
Mr. R. O. Kirchmeyer
Mr. & Mrs. Thomas W. Kirk
Mr. & Mrs. Phillip M. Klasskin
Mr. & Mrs. Walker Kness
Mr. & Mrs. Edwin A. Kurtz
Mr. & Mrs. Dale R. Lankford
Mr. Dennis M. Laws
Lindenwood College
Mrs. Ines H. Lucido
Mr. A. F. Lueck
Mrs. Edmund A. Luning
Mrs. Joel Malen
Mr. & Mrs. John E. Manifold
Mrs. Donna C. Mathei
Mrs. Howard L. May
Mr. & Mrs. Ralph L. Meyer
Mr. Leo Nau, Jr.
Mr. & Mrs. James J. Neskas
Mr. & Mrs. Pete Nettle
Mrs. Margaret F. Peak
Mr. & Mrs. E. W. Phillips
Mr. Raymond F. Pisney
Mr. W. J. Polk, Jr.
Mr. H. H. Pope
Mr. E. F. Porter, Jr.
Mr. W. Ed Quarry
Dr. & Mrs. A. R. Qureshi
Mr. Joe G. Rickman
Mr. Eddy J. Rogers
Ms. Aleene K. Schneider
Ms. Mary Schwarte
Mr. & Mrs. Charles Sincox
Dr. & Mrs. Kenneth R. Smith
Mr. & Mrs. Ronald L. Smith
Mr. Glenn D. Springer
Mr. & Mrs. Robert H. Steinwachs
Miss E. J. Stevenson
Mr. & Mrs. James H. Stobie
Miss G. Ruth Summers
Mr. John C. Sweeney
Dr. Jessie L. Ternberg
Mr. & Mrs. Kenneth S. Tisdel
Dr. & Mrs. Roland A. Triska
Mr. & Mrs. Robert A. Wendel
Mrs. C. t. Wilson
Mr. & Mrs. Richard D. Wire
Mr. & Mrs. E. Wolfe

Tributes

February & March 1982

IN HONOR OF:

Lana Applebaum
Janis Gollub
Mr. & Mrs. Stanley Birger
Mrs. Raymond E. Lange
Mr. & Mrs. Donald Brandin
Dr. & Mrs. Otto C. Hanser
Peter H. Husch
Mr. & Mrs. S. I. Rothschild, Jr.
Dr. & Mrs. Llewellyn Sale, Jr.
Mr. & Mrs. James W. Singer, Jr.
Jane Kahn
Mr. & Mrs. Paul Ullman, Jr.
Ruby O'Dell
Pioneer Garden Club of Warrensburg MO
Alice & Bob Schaeffer
Mrs. Dwigth W. Coultas
Audrey Senturia
Mr. & Mrs. Lester Adelson
Mr. & Mrs. Tobias Lewin
Mr. & Mrs. Paul Ullman, Jr
Dr. Samuel D. Soule
Mr. & Mrs. Aaron Fischer
Mr. Walter Work
Dr. & Mrs. Ben H. Senturia

IN MEMORY OF:

Helen Bach
Mr. & Mrs. Roy Stumpg
Harvey P. Bayer
Lisette Schaumburg
Mary Ellen Beckers
Mrs. David R. Calhoun
Japanese American Citizens League
Mr. & Mrs. George B. Sloan
Lily Magnus Blabon
Mr. & Mrs. Joseph Bascom
Sam J. Bland
Mr & Mrs. Dustin H. Griffin
Lauren Christine Brinkley
Mr. & Mrs. Thomas W. Shields
Lilliam Brown
Lee & Harvey Shapiro
Joseph T. Budde
General Grant Hills Garden Club
James Butler Bushyhead
Mrs. Dwight W. Coultas
Mr. & Mrs. Arthur H. Frank
Bruce George
Mr. & Mrs. C. Toelle
Twenty-five Gardeners Garden Club
Creighton B. Calfee
Mr. & Mrs. Elmber G. Kiefer
Woodrow E. Collins
Florence S. Guth
Harva & Jim Kennedy
James F. Lanier
David & Patty Lehleitner
Mr. & Mrs. Fred Munder
Peter H. Raven
Patricia Rich
Adelaide & Dan Schlafly
Mr. & Mrs. C. C. Johnson Spink
Hans Conried
Dr. James R. O'Neil
Mrs. Elizabeth Cooley
The St. Louis Herb Society
Aileen Burnett Diederich
Mr. & Mrs. Tom S. Eakin, Jr.
Mr. & Mrs. Charles W. Freeman
Mr. & Mrs. Elmer G. Kiefer
C. Robert Pommer
Henry G. Drosten
The St. Louis Herb Society
Mrs. Chiye Endo
Japanese American Citizens League
Mrs. Anna Ferber
Mr. & Mrs. Wm. L. Redmond
Mrs. May C. Fuller
Mrs. Jane Hartrich
John H. Gausch
Friends & Neighbors on Schirmer & Parkwood
Mrs. Elizabeth Gausch
Miss Audrey A. Leibundgut
Thelma E. Mehrhoff
Alice Miller
The Playground Club
Mr. & Mrs. Wm. Sandler
Ella Tappmeyer
Mrs. Jeannette Hayden
Mrs. Helen E. FitzRoy
Thomas B. Hayes, Sr.
Mrs. Walter G. Klosterman
Audrey Stifel Heckman
Mr. & Mrs. Joseph Bascom
Mrs. Jean-Jacques Carnal
Lynne Turner Hofling
Dr. & Mrs. James K. Turner
Mrs. Leona Heidenberg
Margaret & Robert McCormick
Steven Hochschild
Jerome A. Gross
Fred Hoefel, Jr.
Grace Jean Beck
Mr. & Mrs. Oliver J. Belzer
Miss Irma Haeseler
Charlotte B. Leu
Dennis Hufford
Robert L. McCormick Family
Frank Inscho
Marine Blaine
Ruth Hardin
Liz Hughes
Thelma Hull
Libby McCane
Dorothy Olsen
Phyllis Rodgers
Viola Thiel
Mrs. Fern Jones
Belle Coeur Garden Club
Gloria B. Blythe
Mrs. Irene C. Jones
Mr. & Mrs. John Brodhead, Jr.
Mrs. P. Taylor Bryan, Jr.
Mrs. David R. Calhoun
Mrs. John H. Hayward
Mr. & Mrs. Roy W. Jordan
Dr. & Mrs. Peter H. Raven
Mr. & Mrs. Charles Rice
Mr. & Mrs. Daniel L. Schlafly
Mrs. A. Wessel Shapleigh
Mr. & Mrs. Ira Wight
Mr. & Mrs. Elmer W. Wiltsch
Mr. & Mrs. Harry Wuertenbaecher, Jr.
William E. Jones
Mr. & Mrs. Steve Rufer
Mrs. Arthur Korte
Ella Tappmeyer
Cora O. Latzer
Mrs. G. M. Mulher
Dr. Joseph L. Lucido
Paul & June Neal
Pauline Keith
Juleta A. Becker
Dr. McCabe's Mother
Dr. & Mrs. Ben H. Senturia
Mr. George F. McKay
Mr. & Mrs. Dustin H. Griffin
Judy Madden
Alice P. Taylor
William Francis Magruder
Louise C. Lewis
Emmaline Richards
Mrs. Jeanette Marquard
Mr. & Mrs. Dan Schopp
Walter G. Metzger
Art H. Frank & Family
Mr. Jerry Mihm
Helen H. Hutchinson
Edwin Milkert
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Calendar

May

May 1-8:	Beginning May 1, Garden is open until 7:30 p.m. **Carnivorous Plant Exhibit,** Climatron, through May 16, 10 a.m.–7:30 p.m. **Federated Garden Club Show,** John S. Lehmann Building, May 1-2, 2-8 p.m. on 5/1; 10 a.m.-4 p.m. on 5/2 **Sarah Frances Price Exhibit,** John S. Lehmann Building, opens May 3 (Mon-Fri, only) 9 a.m.-5 p.m. (through May 28) **Calligraphy Guild Exhibit,** John S. Lehmann Building, opens May 3 (Mon-Fri, only) 9 a.m.-5 p.m. (through May 27) **Members' Tour,** Main Gate, May 4, 10 a.m. **Lecture:** Rexford Talbert on Thyme, John S. Lehmann Auditorium, May 6, 1 p.m. **Herb Sales,** Plant Shop, Members-only on 5/6 and 5/7 Open to Public on 5/8 and 5/9; 10 a.m.-7:30 p.m. **Linnean House 100th Anniversary,** Linnean House, May 8, 11 a.m.-7 p.m.
May 9-15	**Horticultural Society Show,** John S. Lehmann Building, May 15-16, 9 a.m.-5 p.m. **Carnivorous Plants:** Continues (Final day, 5/16) **Sarah Price Exhibit:** Continues **Calligraphy Guild Exhibit:** Continues
May 16-22	**Sarah Price Exhibit:** Continues **Calligraphy Guild Exhibit:** Continues
May 23-31	**Rose Society Show,** John S. Lehmann Building, May 29-30, 9 a.m.-5 p.m. **Memorial Day, Family Picnic Day,** Grounds, May 31, 9 a.m.-7:30 p.m. **Sarah Price Exhibit:** Continues (Final day 5/28) **Calligraphy Guild Exhibit:** Continues (Final day 5/27)
Education Courses/May	**Introduction to Japanese Culture,** two sessions, A: meets on 5/4-6-11-13; 7-9 p.m. Members: $31 B: meets on 5/18-20-25-27, same time and fee **The Garden in Watercolors,** 5/4, 11, 18, 25 & 6/1, 8, 1-3:30 p.m., Members: $32.50 **Trees for Midwestern Gardens,** 5/5, 12, 19, 26 & 6/2 6-8 p.m., Members $29 **Glade Biology** (Arboretum) 5/8, 9 a.m.-3:30 p.m. Members: $15 **Organize Your Thoughts for Nature Painting** (Arboretum) 5/15, 9 a.m.-4 p.m., Members: $20 **The Tomato,** 5/18, 25, 6-7:30 p.m., Members: $8 **Nature Photography** (Arboretum) 5/22 & 6/5, 9 a.m.-3:30 p.m., Members: $22

June

June 1-5	**Moving Sale,** Garden Gate Shop, Opens 6/1, 10 a.m.-7:30 p.m. (through 6/14) **Members Tour,** Main Gate, 6/1, 10 a.m. **Purple Martin Evening,** John S. Lehmann Building, June 3, 6:30 p.m. **Rose Evening,** Rose Gardens, June 4, 6-8 p.m.
June 6-12	**Moving Sale:** Continues
June 13-19	**Japanese Festival,** Grounds, June 19-27, 9 a.m.-7:30 p.m. ('til 10 p.m. on 6/26) **Moving Sale:** Continues (Final day, 6/14)
June 20-30	**Japanese Festival:** Continues (Final day 6/27)
Education Courses/June	**Evening Walks in the Rose Gardens,** two sessions, A: 6/1, 5:30-7:30, Members: $5 B: 6/8, same time and fee

(All Education Courses meet in John S. Lehmann Building unless they are marked "Arboretum." For information call 577-5140)

For persons interested in herbs and spices, the Garden provides a number of opportunities and features. On May 6, Rexford Talbert, a nationally recognized expert on thyme, will present an illustrated lecture in the John S. Lehmann Auditorium at 1:00 p.m. Mr. Talbert, from Washington, D.C., has lectured at the Smithsonian Institute, and participated in herb symposia in Ohio.

May 6 is also the first day of the Members-only presale of the Spring Herb Sale in the Plant Shop; Members will receive a 20% discount on more than 50 types of herbs (more than 10,000 plants) during the sale which continues through May 9. Hours are 10:00 a.m. until 7:30 p.m. Members of the St. Louis Herb Society will be present in the shop to answer questions and offer suggestions on herb use and cultivation.

On the south side of Tower Grove House, Henry Shaw's 1849 country home, is a fine herb garden, maintained by the Society. Here visitors are able to learn the variety of herbs that will grow in St. Louis, as well as discover how many common herbs and spices appear while growing, before they are dried and packaged.

The Society, which recently celebrated its 40th Anniversary, also established an excellent collection of literature on the history, use, cultivation, and folklore of herbs. This collection is maintained by the Missouri Botanical Garden Library in the John S. Lehmann Building, and is available for Garden Members on weekdays, from 9:00 a.m. until 5:00 p.m.

MISSOURI BOTANICAL GARDEN BULLETIN (ISSN-0026-6507)
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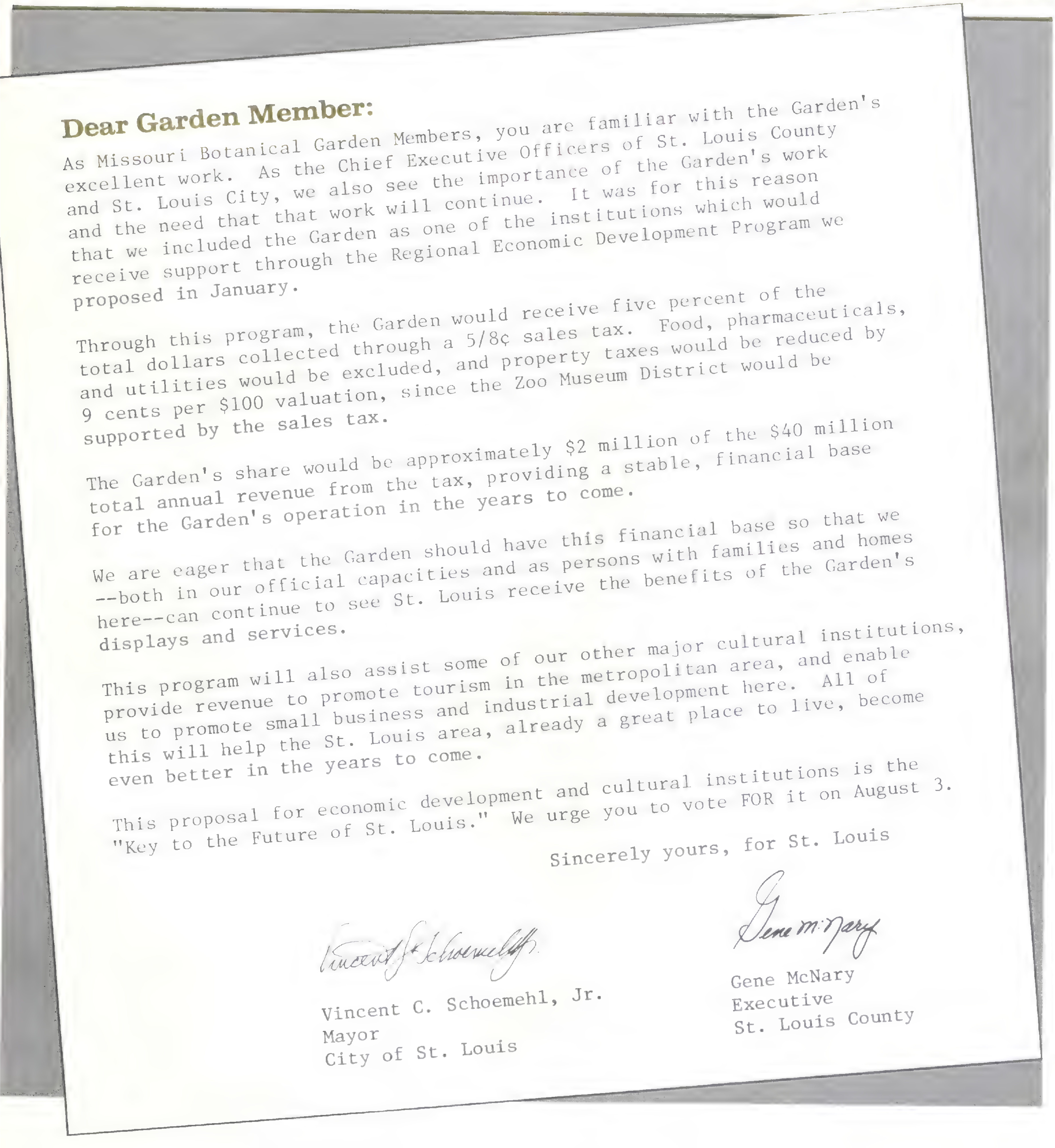
Missouri Botanical Garden Bulletin



Dear Garden Member:

As Missouri Botanical Garden Members, you are familiar with the Garden's excellent work. As the Chief Executive Officers of St. Louis County and St. Louis City, we also see the importance of the Garden's work and the need that that work will continue. It was for this reason that we included the Garden as one of the institutions which would receive support through the Regional Economic Development Program we proposed in January.

Through this program, the Garden would receive five percent of the total dollars collected through a 5/8¢ sales tax. Food, pharmaceuticals, and utilities would be excluded, and property taxes would be reduced by 9 cents per $100 valuation, since the Zoo Museum District would be supported by the sales tax.

The Garden's share would be approximately $2 million of the $40 million total annual revenue from the tax, providing a stable, financial base for the Garden's operation in the years to come.

We are eager that the Garden should have this financial base so that we --both in our official capacities and as persons with families and homes here--can continue to see St. Louis receive the benefits of the Garden's displays and services.

This program will also assist some of our other major cultural institutions, provide revenue to promote tourism in the metropolitan area, and enable us to promote small business and industrial development here. All of this will help the St. Louis area, already a great place to live, become even better in the years to come.

This proposal for economic development and cultural institutions is the "Key to the Future of St. Louis." We urge you to vote FOR it on August 3.

Sincerely yours, for St. Louis

Vincent C. Schoemehl Jr.

Vincent C. Schoemehl, Jr.
Mayor
City of St. Louis

Gene McNary

Gene McNary
Executive
St. Louis County

Comment

August 3 is an important date for the Missouri Botanical Garden and the St. Louis Community. On that day, a Tuesday, voters will decide to accept or reject the program for regional economic growth proposed by Gene McNary and Vincent C. Schoemehl, Jr. in January. That program and its significance for the community and the Garden are explained elsewhere in this *Bulletin*.

We, and many others, are convinced that the future of our community, the City and County of St. Louis, depends on an organized program of economic development and support for our cultural institutions. With an excellent Zoo, Art Museum, Symphony, as well as several other museums and performing arts groups, St. Louis is rich in cultural resources. There are also undeveloped and under-developed areas that could be well used as sites for new business and industry, thereby providing jobs for our unemployed and under-employed citizens.

St. Louis has much to offer both to its residents and those outside the area, but for it to meet its potential requires a stable, well-planned and managed program of development. This proposal by the area's two Chief Executive Officers will provide such a program. On behalf of the Missouri Botanical Garden I urge each of you to vote FOR it on August 3.

Peter H. Raven

You can vote by absentee ballot if you will be out of town on August 3. Contact the election board in the City or County of St. Louis depending on where you are registered to vote.

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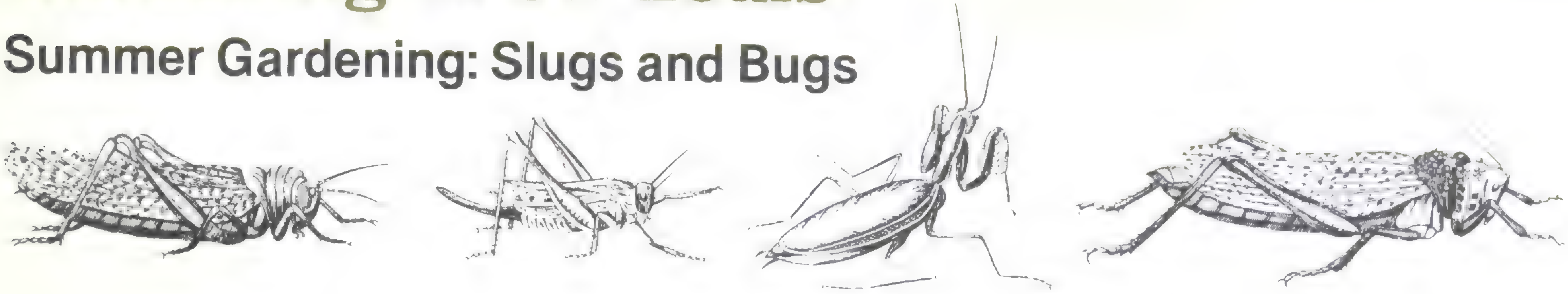
The **Missouri Botanical Garden Bulletin** is sent to every Member of the Garden as one of the benefits of their membership. For a contribution as little as $30 per year, Members also are entitled to: free admission to the Garden, Shaw Arboretum, and Tower Grove House; invitations to special events and receptions; announcements of all lectures and classes; discounts in the Garden shops and for course fees; and the opportunity to travel, domestic and abroad, with other Members. For information, please call 577-5100.

Gardening in St. Louis

Summer Gardening: Slugs and Bugs



Where plants flourish so do slugs and snails. To help control them try these methods:

1. Beer: This has been a popular control method. It consists of placing beer in a shallow pan (like a pie pan) and sinking this pan so that it is level with the soil. The snails and slugs are attracted by the use of the beer and drown in the brew. To me this method has two (2) major drawbacks. It is a waste of good beverage and it leaves someone with the very unpleasant task of disposing of a pan full of dead snails or slugs.

2. Barrier: Some people have been somewhat successful in preventing slugs from getting into their plants by placing a ring of sand, dry sawdust, or cinders around their plants. This creates a barrier of rough material over which most slugs refuse to cross.

3. Remove mulch: Mulching plants is a valuable cultural procedure for reducing weed growth and retaining moisture, but when we get wet weather it does cause problems. The mulch keeps the soil around the plants too damp and cool. This creates an ideal habitat for slugs. You should remove the mulch around the plants until the soil becomes fairly dry.

4. Poison Bait: This is usually the most effective means of control. You can use Mesurol on ornamental plants and Metaldehyde on vegetables. If you are afraid of poisoning animals you can place small clusters of the bail pellets on your garden soil and cover them with inverted margarine containers that have two or three one-inch openings along the rim which allow the slugs to enter. Place stones on top of the containers to prevent them from being blown over.

Alternative Insect Control

If you prefer not to use conventional insecticides you might like to try a relatively new product called Safer Agro-Chem's Insecticidal Soap. This is a specially formulated soap that's no more harmful to humans than hand soap, but is very effective in controlling most destructive insects including aphids, white flies, fungus gnats, grasshoppers, mites, scales and tent caterpillars. It can be used on vegetables, fruits, houseplants and ornamental and does not harm beneficial insects like honey bees or ladybeetles. This product is a little more expensive to use than other chemical controls and does require that you thoroughly spray the plant since the insects will only be killed if they are touched by the soap. Give this material a try; our Plant Shop has it.

Controlling Disease on Roses

Last summer's wet weather caused rampant outbreaks of leaf diseases on roses. Although several chemicals can be used to control rose leaf diseases such as Benlate Benomyl) and Phaltan (Folpet), one of the newer materials which is effective is Funginex (Triforine). Two significant advantages of this material over others are that it is a clear liquid so that it does not leave an unsightly residue on the leaves and that it is effective on all three (3) of the major rose leaf diseases — black spot, rust and powdery mildew.

Home Watering Systems

Plants are 75%-95% water. During the life of a leaf lettuce plant it uses 9 inches of water, a cucumber or watermelon plant uses about 15 inches and a tomato plant needs about 24 inches. During a hot summer some supplementary watering is usually needed to provide optimum growing conditions. Gardeners commonly provide this needed moisture by hand watering with a hose nozzle or by using various lawn sprinklers. Unfortunately hand watering takes a lot of time and lawn sprinklers are usually inefficient.

Today many different watering systems are available to the home gardener. They are easy to install, save the gardener time, and use water much more efficiently by delivering it to the plants in need. One such group of watering systems is called the drip irrigation. This system of irrigation involves a controlled application of water at a very low rate, a "drip", which is delivered to a specific area or plant. It is being used extensively by commercial fruit and vegetable growers. I have been trying out various systems on my home garden and have been very happy with the results. Systems which are designed for the home gardener include *Submatic Irrigation Systems,* P.O. Box 246, Lubbock, Texas 79408. This company makes several different systems for various home applications. Send for their catalog for more details. *Raindrip, Inc.,* 14675 Titus Street, Panorama City, CA 91402. Two (2) basic systems — one for container plants and one for plants in open beds are available from this company. These systems are easy to install; no tools or glue are required. Our plant shop carries this company's products. *Dew-Hose* made by Chapin Watermatics, Inc., 740 Water Street, Watertown, N.Y. 13601. This system is versatile and fairly inexpensive. It is available in some local garden centers or directly from the company. This company has been in the irrigation business for a long time and sells many commercial systems for greenhouse and field crops. *Shur-Flo Water Savers,* Knobel Industries, 1146 Madison Avenue, Livermore, CA 94551. I have been using this special waterhead which this company sells in my rose garden and have been very happy with the results. These waterheads are plugged into one-half or three-fourths inch black polyethylene pipe. They create a gentle, deep soaking stream of water. They are ideal for roses, trees and shrubs since they drench the soil without getting any of the foliage wet. This is a real advantage in preventing leaf diseases.

—Steven A. Frowine, Chairman, Indoor Horticulture

A Future Together

The City, the County, the Garden

The St. Louis area is one of about a half dozen metropolitan areas in the United States that have unique geo-political situations. St. Louis, the city, is not a part of St. Louis, the county, although it is surrounded on three sides by the county. The fourth side is bounded by the Mississippi River. San Franciso, Philadelphia and Baltimore have similar situations.

Because of this, the city and county governments have traditionally been strong competitors for attention, new business and industry, and income. Some experts have claimed this competition has hindered development of both areas in the past.

In January of this year, however, the heads of the two governments, the City's Mayor Vincent C. Schoemehl, Jr., and the County's Executive Gene McNary, moved away from this rivalry and jointly proposed a program of economic development that would benefit the whole metropolitan area. Characterized as "an imaginative proposal" and "historic for its degree of cooperation" in editorials in the *Post-Dispatch* and *Globe-Democrat*, the Regional Economic Development Program, as it is called, provides for the collection of $40 million annually through a 5/8 cent increase in local sales tax. The funds would be used to promote tourism, attract new business investment, and help support the area's major cultural institutions. It is anticipated that the tax, which would exclude food, pharmaceuticals, and utilities, will cost a family of four with a $25,000 annual income an estimated additional $36 per year. However, that same family with a $50,000 home with a normal assessment would have their property tax reduced by about $15, since the tax measure calls for reduction of property tax by 9¢ per $100 assessed valuation.

It is also estimated that approximately a quarter of the tax would be collected from non-residents such as tourists and visitors from other areas.

The tax has been called by its supporters "the key to the area's future." Mayor Schoemehl said, "Without economic development and our cultural institutions there would be no growth. Without growth, there would be no jobs, and the slow death of the entire community." County Executive McNary concurred. "Either we grow or we become stagnant," he said.

The $40 million generated by the tax would be divided:

- Between the city and county according to the collection proportions: one-third in the city and two-thirds in the county.
- Forty percent — $16 million — would be used to provide operating support for six St. Louis cultural institutions, the Garden, Zoo, Art Museum, Museum of Science, Museum of Transportation, McDonnell Planetarium, and performing arts organizations.
- Thirty percent would go to a new Economic Development Commission and be used to buy and improve land for economic development and to provide funds for new business investments.
- Twenty percent — $8 million — would be used to promote tourism and conventions in St. Louis.
- The final 10 percent would be used for either economic development or tourism promotion.

"It can be said without argument that the City an County need the means to stimulate economic develop ment," said a *Globe-Democrat* February 6 editorial "Ultimately the voters should ask themselves whethe (they) find economic stagnation and unemployment more affordable than a...sales tax."

A Garden for All Time

Of the $16 million set aside fo cultural institutions in the Regiona Economic Development Program $2 million are reserved for use by new botanical garden subdistrict in the already existin Zoo-Museum Tax District.

"The establishment of this subdistrict is important the Garden is to continue to provide outstanding educa tional and horticultural services," said Dr. Peter H. Raven the Garden's Director. "It's important that the Garden liv up to its promise to make the fullest contribution it can.

"Despite the continuing generosity of our members an donors, expenses continue to rise unrelentingly and at pace faster than our income is growing, primarily as result of inflation."

Referring to the Garden and the other five cultural inst tutions included in the program, Mayor Schoemehl said, "

(continued on page

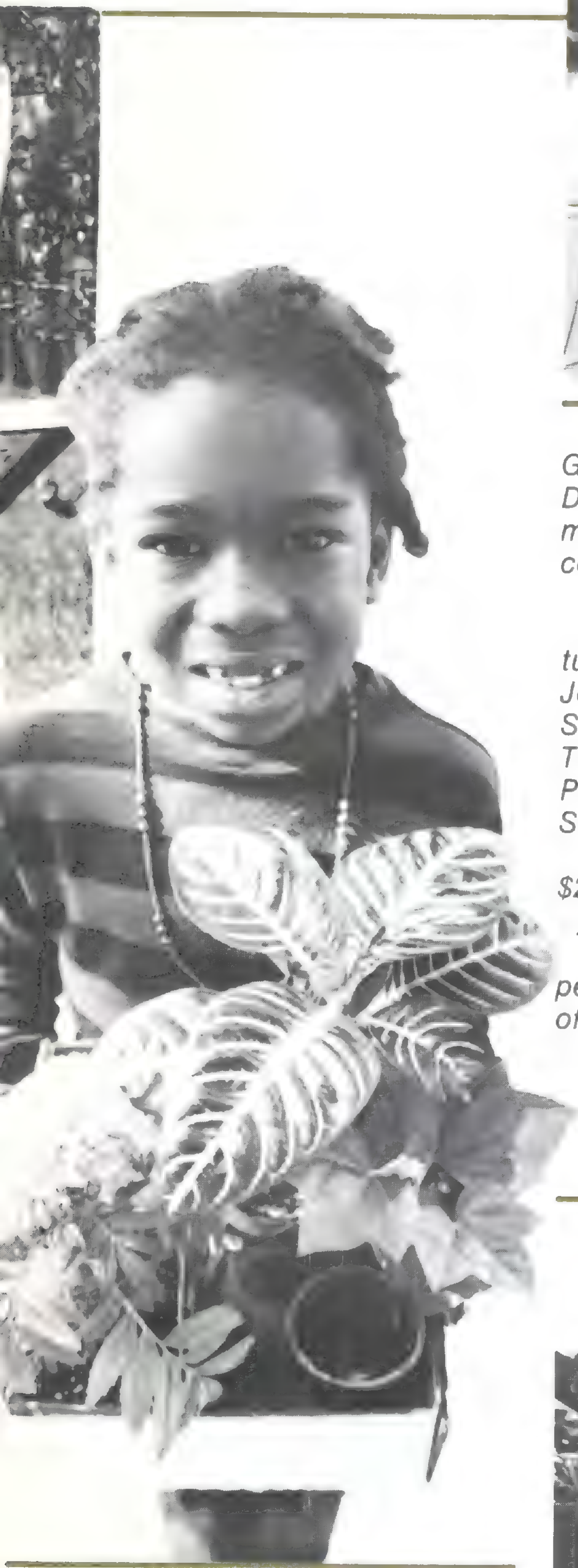
Under the conditions of the Regional Economic Development Program, the Garden would reduce its general admission fees. According to Peter H. Raven, Director, during certain times the Garden would be open, free of charge. The maximum adult admission fee would be $1.00; for person 6-16, it would be 50 cents. Currently, admission fees are $2.50 and $1.00 respectively.

A 1979 study of eight St. Louis cultural institutions revealed that those institutions had a $63 million impact on the local economy in 1978. Conducted by Johns Hopkins University, the study concerned Missouri Botanical Garden, the St. Louis Art Museum, St. Louis Symphony, CASA, Loretto-Hilton Repertory Theatre (since renamed Repertory Theatre of St. Louis), McDonnell Planetarium, Museum of Science and Natural History, and Dance Concert Society.

At that time, the eight organizations employed 500 persons and generated $21 million in direct expenditures. They indirectly generated 2,000 additional jobs and $42 million in expenditures.

The university also studied each institution's visitors, and found that 40,000 persons came from outside the St. Louis area specifically to visit one or more of the institutions.

Of the eight institutions, four (the Garden, Art Museum, Planetarium, and Science Museum) are specified to receive funds through the Regional Economic Development Program. The other four could receive support through the Performing Arts Fund provided by the Program.



"The area's cultural institutions need a more secure source of funding; and certainly a single tax is preferrable to an unhealthy competition among them for additional revenues...Similarly, instead of competing for business and attention, the city and county need to do everything within their power to encourage job-creating tourism and business investment throughout the area."

—Editorial-*St. Louis Post Dispatch*
January, 1982

A Future Together

A Garden for All Time (continued from page 4)

region's quality of life is a major factor that businessmen consider when deciding where to locate. If cultural institutions are atrophied for lack of money, the region will have a hard time selling itself."

The Missouri Botanical Garden, the only major botanical garden in the world that does not currently receive a major portion of its operating income from direct tax support, is financed through contributions, institutional and government grants, and admission fees in addition to the bequest from Shaw's will. Until 1939, the bequest provided 100% of the support; in 1981 all investments and endowments represented only 18% of the total support.

"The Garden must establish a strong financial foundation as we move forward through the current decade during which time the need for us to maintain the diversity and quality of our services will become even greater," Raven said.

The 123-year-old garden provides horticultural displays and educational programs in addition to being one of the world's most active botanical research centers. In 1981, more than 46,000 students participated in programs at the Garden. Nearly 400,000 individuals visit the Garden each year.

C. C. Johnson Spink, President of the Board, explained that funds from the sales tax would be used to bolster the educational programs and to improve and maintain garden features and greenhouses, some of which are more than 100 years old. The tax support would prevent having to cut programs in the future. "The Garden has always operated within a balanced budget," he said. "Continuing to do so — and we intend to maintain a balanced budget — with our current means of support would mean a serious review of all of our programs and services and cutting some of them.

"We feel that the proposal...represents a realistic approach to providing support for the much needed development of the St. Louis area, including jobs, tourism, and general economic development.

"Beyond the obvious and significant economic development benefits the proposal promises for the St. Louis area, we feel it also represents an effective means of support for our community's cultural institutions. That support will be vital to the area's cultural life in the future and equally vital to the continued prosperity and development of the Garden."

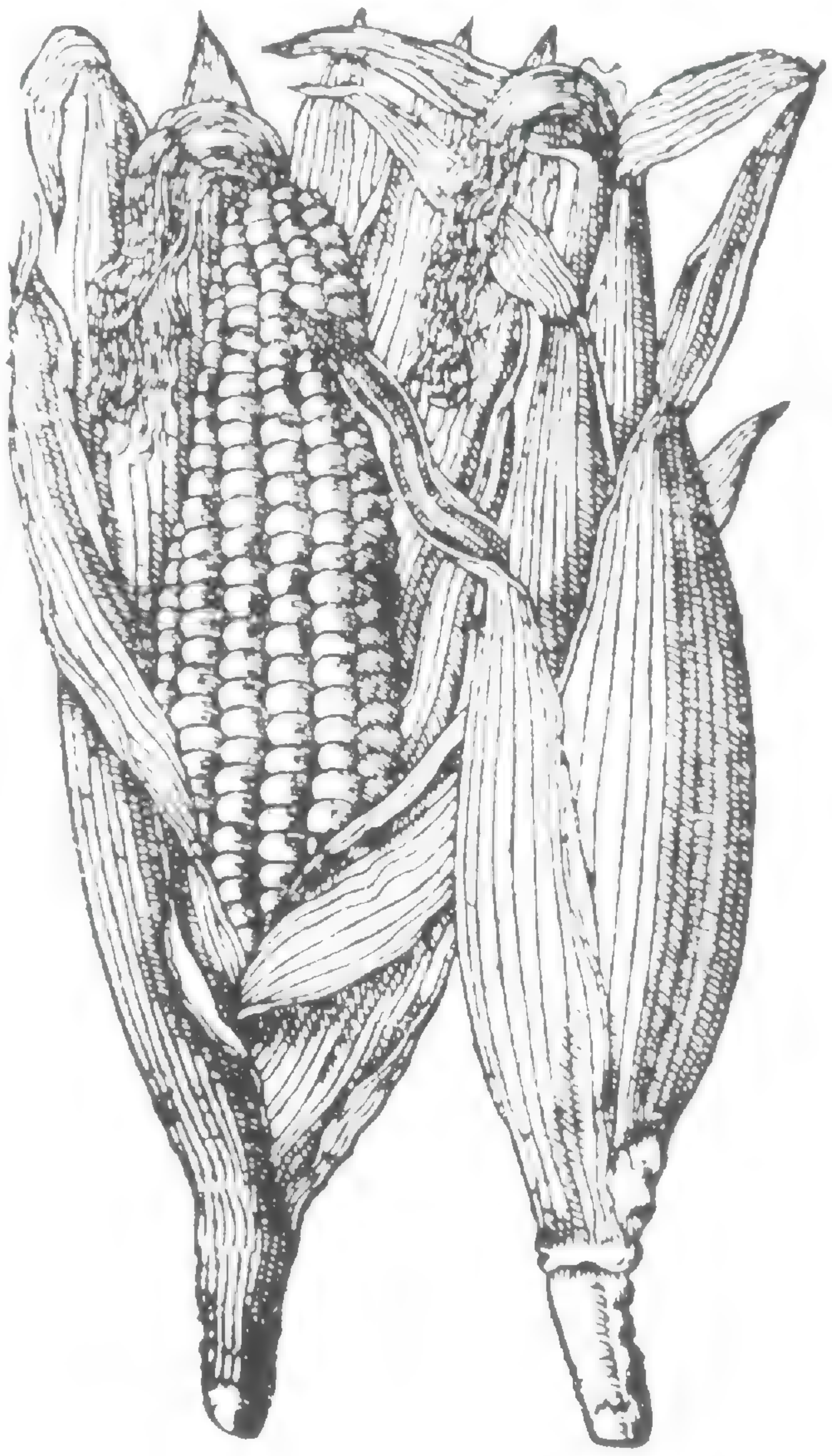
The $2 million the Garden would receive from the Regional Economic Development Program is equivalent to 5% of the total tax the program will generate. The other cultural institutions would receive: Art Museum 8%, ($3.2 million); Zoo 8%; Museum of Science, 5%; McDonnell Planetarium 2%, ($800,000); Transport Museum 2%, ($800,000).

An additional five percent would be for capital improvements at these six institutions. This $2 million would be divided according to specified needs in a particular year.

Another 5% will be used to support performing arts i the area. The Zoo, Art Museum, and Museum of Scienc currently receive a total property tax of 9¢ per $100 assesse valuation. If voters approve the sales tax, this property ta would be repealed.

Irony and Paradox in the Corn Field

It is ironic that, in the 10,000 years of its cultivation, one of the most important discoveries pertaining to corn — the single, most important crop of the Western Hemisphere — was an accident. It is also ironic that the accident occurred, not in an agricultural laboratory, nor in the one-third billion acres of cultivated American farmland — the U.S. produces about 7 billion bushels of corn a year, half the world's total — but on a remote, Mexican mountain.



This discovery, that of a primitive relative of corn, was made by a botany student at the University of Guadalajara, Rafael Guzman. His professor had mentioned to a group of students that in 1910 an American scientist discovered in Mexico a plant known as *Zea perennis,* perennial teosinte. By 1921, the plant was no longer found in the wild and was presumed extinct. Guzman decided to search for it; in 1977, he found several stands of it in the Sierra Manantlan Mountains of southern Jalisco. He sent several of the seeds to a mid-western United States university, reported his discovery in two scientific journals, and resumed work at his university.

There was interest in his discovery, because it is not often that a plant is rediscovered after being considered extinct, but the true significance of what he found in the mountains was yet to be uncovered.

At the U.S. university, the University of Wisconsin, a student planted and grew the seeds in pots in his backyard. After several months, he showed the plants to his professor, Dr. Hugh H. Iltis. Not all were identical. "Somehow they didn't look right," Iltis, an expert in the botany of corn, said. A chromosome count taken from the roots of one of the plants showed his hunch correct. Some of the plants were *Zea perennis;* some were something else altogether.

Zea perennis, the plant discovered in 1910 and which Guzman rediscovered, is what scientists call a *tetraploid;* it has four sets of ten chromosomes. The plant that Iltis examined was a *diploid,* having two sets of ten, or 20 chromosomes. The difference between 20 and 40 chromosomes seems at first like scientific hair splitting if you consider that a single chromosome is only a few microns in size. (A micron is 1/1000 of a millimeter; about 25,000 microns equal an inch.) However, the difference between 20 and 40 chromosomes becomes enormous if you consider that corn, *Zea mays,* is also a diploid. Because corn and the newly discovered plant, since named *Zea diploperennis,* have a compatiable number of chromosomes, the two can be crossed to produce a new corn hybrid that is perennial. Further examination of *Z. diploperennis* has shown it also is valuable for traits other than being perennial.

When the new plant was reported in *Science* in January, 1979, there was a flurry of excitement. The popular press spoke of "revolutionary implications for agriculture" and "fundamental changes in corn." Some predicted that the development of a perennial corn was imminent and would provide a major new source of food in a world in which 40% of the population is undernourished. Seed companies and corn breeders began requesting seed. One company, Pioneer Hybrid, a leader in corn development, financed an expedition that included Dr. Iltis and Rafael Guzman to explore further for more *Z diploperennis.*

The Ohio Agricultural Research and Development Center tested the plant for susceptibility to nine major corn viruses; it proved tolerant or immune to seven. This means that, in addition to being able to cross *Z. diploperennis* to create a perennial corn, scientists could also develop hybrids that are not susceptible to these viruses.

One of the major paradoxes of modern agriculture and particularly of corn production is that the short term goal of high productivity runs directly counter to the long-term genetical health of the crop. Because it is such an important crop and the world depends on plants that provide a high seed yield, agricultural scientists have developed varieties of corn that are so genetically identical that the world's crop is highly vunerable to disease. In 1970, a fungus destroyed 15 percent of the crop in the Corn Belt. If farmers plant millions of acres of corn plants, each one of which is a precise duplicate of the one beside it, and one does not possess a gene to make it immune to a disease, none of the others will possess that gene either and the disease will run through the crop like wildfire. It is not an accident that all of the ears of corn in a produce bin of a St. Louis supermarket are roughly the same length, thickness, color, and taste. But to produce such uniformity, sacrifices are made.

It is not that scientists purposely sacrifice disease resistance to develop corn plants with high yield. The fungus that was so devastating in 1970 was an unforseen mutant strain; the known strain of that fungus had in the past rotted a few ears, but had never caused serious damage. In a field containing a natural diversity of corn plants, while the yield may be less, part of the crop could survive a disease since some could possess genes of immunity.

The fact that high yielding corn plants are necessary to meet global demand is an ironic reason there will be little commercial demand for a hybrid, perennial corn in the near future. Although a large part of the cost of corn production is in the annual sowing of a new crop and subsequent plowing under of harvested stalks, the necessity of a high yield insists that commercial corn produced for grain be an annual. As a rule, annual plants like corn invest a large

(continued on page 15)

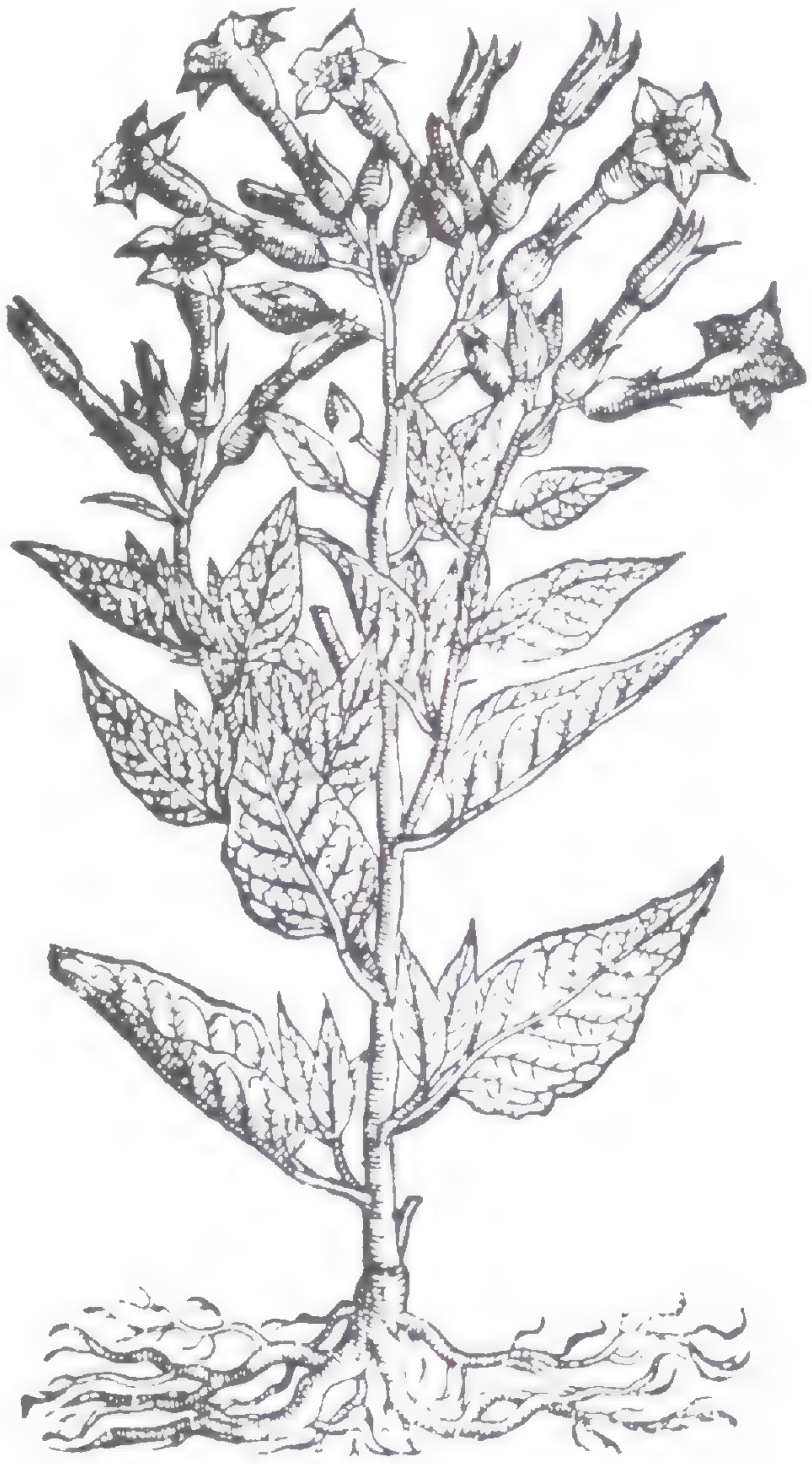
The Solanaceae or Potato Family

For food, for ornament and for medicine, the Solanaceae is a plant family of great value to man. At the same time, some of its members are poisonous and some are noxious weeds. Some well known plants in the family are tomatoes, potatoes, petunias, and tobacco.

The 3,500 species of the 90 odd genera in the family are heavily concentrated in the New World, although there are many species in the Old World, and some are almost cosmopolitan.

Members of the Solanaceae were important in medieval Europe as witchcraft plants — Deadly Nightshade, Bittersweet, Belladonna, Mandrake, Henbane — because of the strong alkaloids these species contain. Taken in various ways, they could dull pain or stimulate hallucinations. A common symptom in the person under influence of these drugs was a belief that he had become an animal, hence the origin of werewolves in European mythology.

After the discovery of America and European explorations into Asia, members of the Solanaceae became important food plants and were soon transported to and used in most countries of the world. Hot chili peppers were taken back from the West Indies by Columbus on his first voyage, and soon after they were carried to India and Asia by Portuguese who landed in Brasil on their way around southern Africa. The chili pepper is so thoroughly established in the cuisine of Mediterranean and Far Eastern cultures that many people believe the plants were always there.



Soon after the discovery of India and America, the eggplant made its way across the Middle East into Europe where it became an important ingredient for Italian cooks. About the same time, tomatoes and white potatoes were brought to Europe, although they were not accepted as wholesome or even safe to eat for a long time.

When potatoes finally were accepted, it was in a big way, for they soon became the basic staple in peasant diets of northern Europe. The effects of the potato blight which killed the potato crops in the middle of the last century were devastating, and this, the biggest crop failure in history, led to over a million deaths in Ireland and on the continent. In the last century, tomatoes also became widely accepted, and they are now a part of cooking in almost every country. The major solanaceous food crops, peppers, potatoes, tomatoes and eggplant, are now enjoyed by people all over the world.

Besides these main crops, a number of other Solanaceae are used for food in various countries. In South America, the lulo, naranjilla, coconilla and related species of *Solanum* have hairy fruits which make delicious juices. The genus *Physalis* in Mexico provides the tomatillo, which can be purchased fresh in Mexican import shops in St. Louis, and from South America it provided the 'Cape Gooseberry' which is used in pies and jams in parts of Africa. Seedsmen and nurserymen in the United States sometimes feature wonderberries, a tasty relative of the black nightshade from Africa, and the tree tomato, a shrub from South America that is an important fruit crop in New Zealand.

The Solanaceae has provided us with a number of useful ornamentals, best known of which is probably Petunia. This favorite garden subject has been manipulated by scientists to come in many colors and sizes, and there are double and triple forms. Several species of *Nicotiana* are grown for their showy night-scented flowers. The Jerusalem or Christmas Cherry is sold at Christmas for its attractive red pepper-like fruits, and ornamental peppers are widely grown both indoors and outdoors.

A few species are cultivated for other purposes: a spiny species of *Solanum* is grown around African farmsteads to fence out large animals; plants of *Acnistus* are cultivated by orchid growers for its branches which seem ideal for attaching these interesting epiphytes; and of course that 'filthy weed,' tobacco is a large scale crop in many countries. *Nicotiana tabacum* is the main species smoked today, but another species, *Nicotiana rustica,* was grown in Missouri and other parts of North America by the Indians long before the Europeans came.

For medicinal or drug plants, the Solanaceae is well known, and it supplies several important different classes of alkaloids. One group, the steroids, is used as precursor material for making the birth control pill. Another group, the withanolides, have shown promise in the treatment of cancer. Still another group of alkaloids simulates in part the activity of vitamin D in the body and has been useful in the study of human aging. Tropane alkaloids are found in many Solanaceae. These affect the nervous system and can be used for dulling pain, inducing sleep, dilation of the pupils, to reduce muscle spasms, and as diuretics. They have also been used as hallucinogens, and the relaxant nature of alkaloids ingested as tobacco smoke is well known.

Uninformed use of these alkaloids is dangerous and may result in self destructive behavior and sometimes death, so the Solanaceae must be regarded as a generally poisonous plant family. Except for the fruits, plants of tomatoes are poisonous, and all green parts of the potato are poisonous. There have been serious poisonings and even deaths of people who ate potatoes that had turned green from being exposed to sunlight.

— William G. D'Arcy, Associate Curator Solanaceae Exhibit, Climatron and Grounds, July 31-August 15.

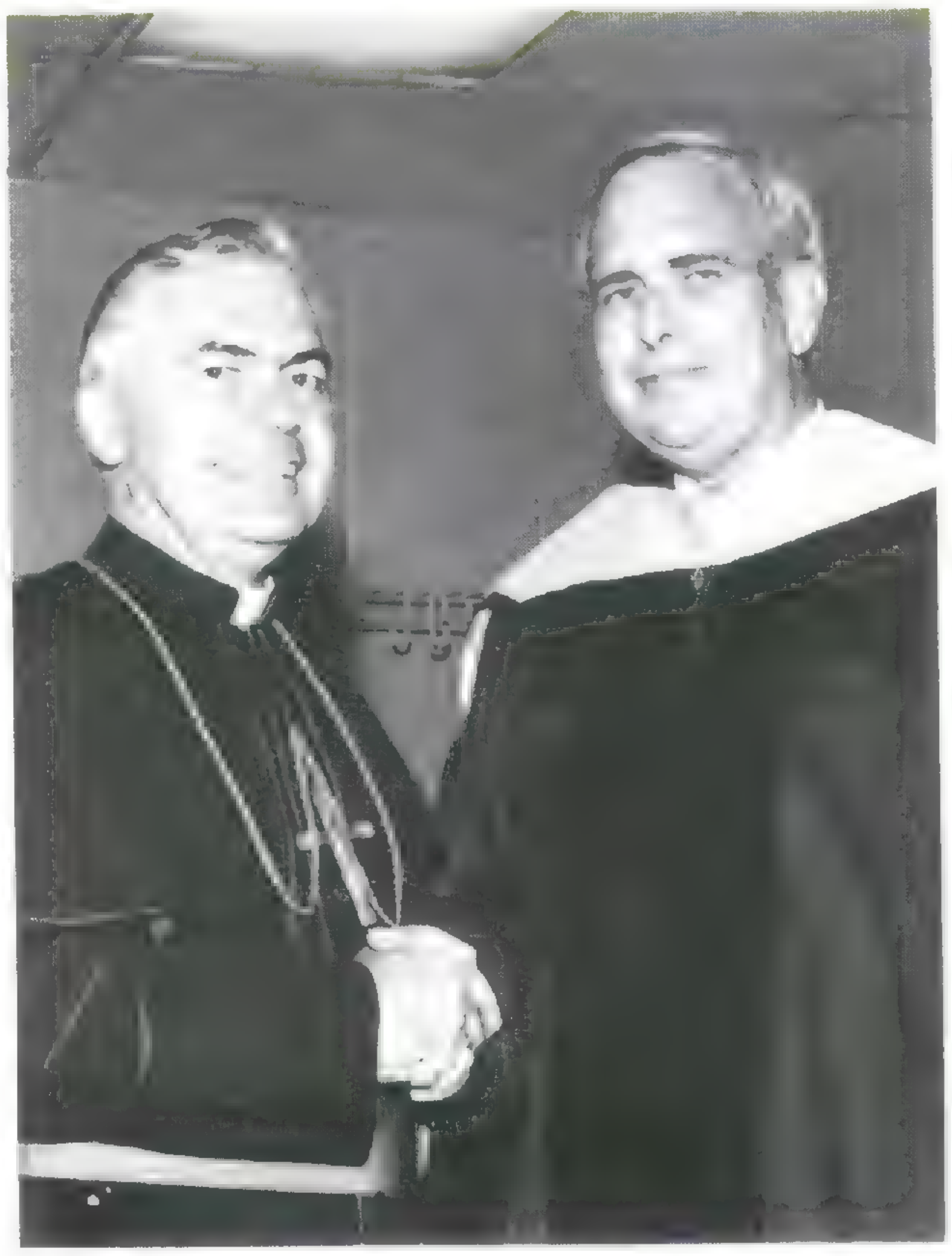
Notes from the Garden

The officers of the Executive Board of the Members were installed at the Board's April meeting. Pictured, left to right, are Mrs. Shadrach Morris, President; Mrs. Bernard Brinker, Second Vice President; Mrs. Walter Stern, First Vice President; Mrs. Charles Schott, Treasurer. Not shown is Mrs. Rudyard Rapp, Secretary.

The Linnean House is 100 years old this year, and the Garden, with the help of the Swedish Council of St. Louis, celebrated the anniversary on May 8. The greenhouse, the oldest still operating in the United States, was built by Garden founder Henry Shaw in 1882 and was named for Carl Linnaeus, the great Swedish scientist of the 18th Century who devised the modern method of plant and animal classification. The festivities included a concert by a harmonic bell choir, a Maypole dance, and the re-enactment of a traditional Swedish wedding by Genevieve and Carroll Nelson who were celebrating their 50th wedding anniversary........................

The Royal Swedish Academy of Sciences recently elected Dr. Peter H. Raven, the Garden's Director, as a Foreign Member in Botany. The Academy, which annually awards the Nobel prizes in the categories of physics, chemistry, and economics, was founded in 1739 by Carl Linnaeus and several other scientists. It is an independent scientific organization that conducts and supports research activities in Sweden and other selected locations of the world. There are 115 foreign members of the Academy........................

Dr. Raven was also appointed to the 25-member panel of the Commission on Museums for a New Century, an independent group concerned with the preservation of American cultural and scientific institutions. The panel is interested in re-establishing museum emphasis on education and research, and in discovering ways in which museums can use modern technologies ....



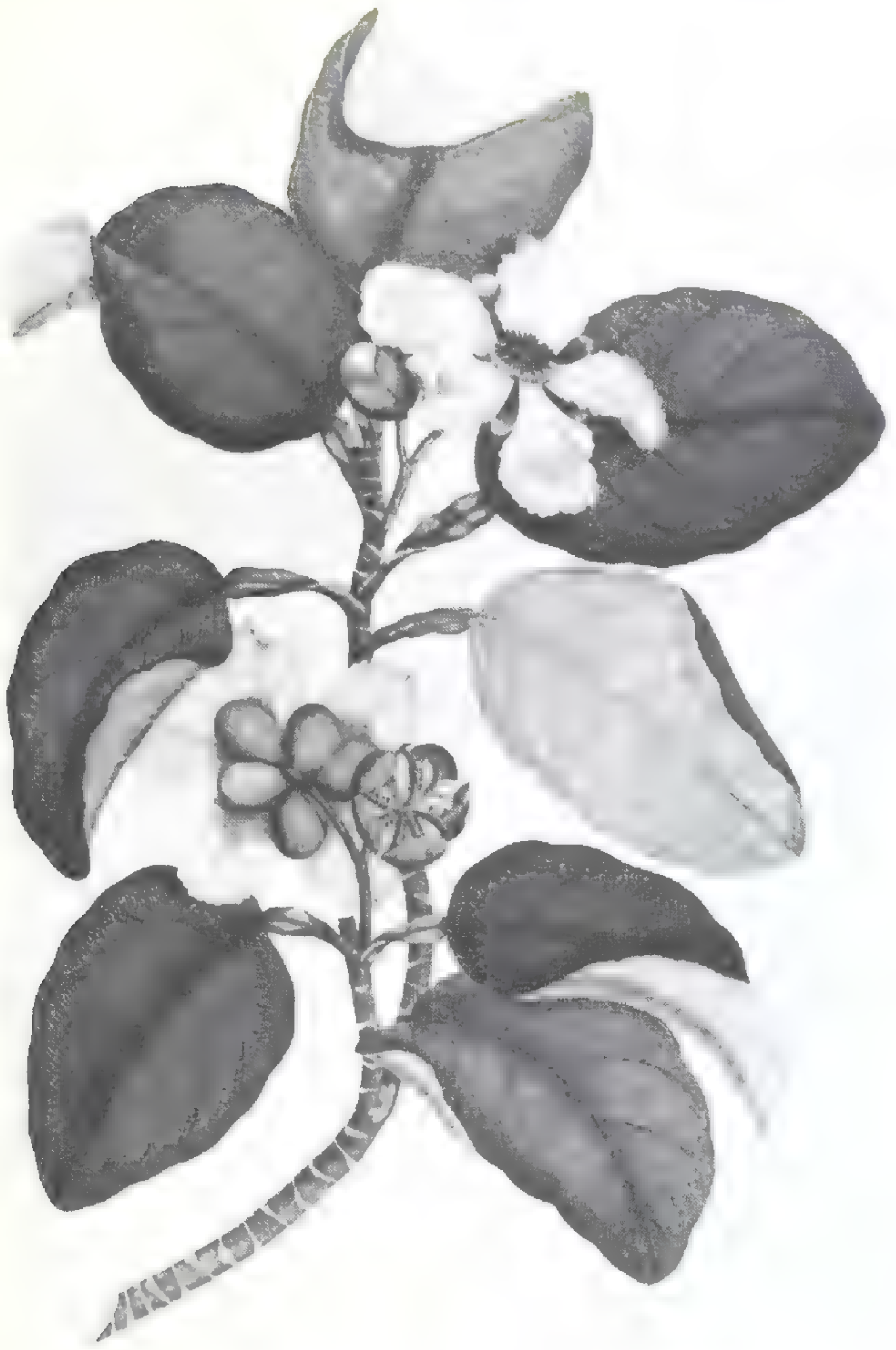
Dr. Peter H. Raven, here with The Most Reverend John L. May, Archbishop of St. Louis (left), received an Honorary Doctor of Science degree from St. Louis University at that institution's graduation ceremonies in May. Dr. Raven was the featured speaker for the commencement.

Roses, tulips, and African violets are St. Louis's three favorite flowers according to the Garden's recent poll. During the spring, visitors were asked to vote for their ten favorite flowers; viable seeds of the ten receiving the most votes will be included in a time capsule that will be placed into the Ridgway Center monument located near the building's entrance. The other seven flowers that will be included are orchid, waterlily, azalea, daffodil, iris, pansy, and lilac. The time capsule will be opened in 2059, the Garden's 200th anniversary......

The time capsule also contains a copy of *Missouri Botanical Garden Bulletin*, the Garden's 1981 Annual Report, a Ridgway Center floor plan and rendering, a McCarthy Brothers construction hardhat, a button showing the Garden's logo, a volunteer's name plate, and predictions of St. Louis's future by fourteen prominent residents. The volunteer name plate is that of Lucille Gausch who has volunteered in Tower Grove House for 20 years. Predictions were solicited from Christopher S. Bond, Vincent C. Schoemehl, Jr., Gene McNary, G. Duncan Bauman, Joseph Pulitzer, Jr., Robert F. Hyland, Carl E. Officer, Ruth Bryant, Martha Rounds, Jack Carney, Jerry Berger, Marge May, Dan Dierdorf, C. C. Johnson Spink, and Peter H. Raven..........

One additional item included in the time capsule is one of Henry Shaw's razors; he had one for each day of the week. The capsule itself, made of stainless steel, was a gift of the Monday Security Corporation of Webster Groves........................

Applications for the Fall Festival are still available, although the space is beginning to be filled. The Festival, first of what is planned to be an annual event, is an opportunity for Members and others to demonstrate and sell their hobbies and crafts. It will be held in the new Ridgway Center, October 8-10. Send a self-addressed, stamped envelope to: Fall Festival Committee, Missouri Botanical Garden, P.O. Box 299, St. Louis, Missouri 63166 ....



Beginning last year and continuing into 1986, the Garden's Library is receiving a total of seventeen shipments that, together, document the plants collected during Captain James Cook's first circumnavigation of the globe in the years 1769-71. This series is one of the landmark publishing events of the 20th century.

Accompanying Captain Cook on this voyage of the H.M.S. *Endeavour* was the English botanical artist Sydney Parkinson who with his assistants made paintings or sketches of the plants collected during the voyage. Upon the *Endeavour's* return to England, Parkinson's work was turned over to a group of engravers. These engravers produced nearly 750 engraved copperplates, with the intention that they were eventually to be published. Sir Joseph Banks, founding father of the British Museum (Natural History) paid the engravers for their work, but eventually lost interest in the project. Consequently, the plates were never published, except for a few selections printed in black and white over the years.

In 1980, nearly 200 years after the last plate was engraved, Alecto Editions in London began publishing, in color, a comprehensive edition of the 738 plates that have survived intact, in a limited edition of 100 copies. Only 15 copies are reserved for sale in all of North America.

Each of the engravings is printed *a la poupée,* with up to ten colors being worked directly into a single plate before the print is pulled, with additional hand water-coloring where needed.

As of this time, the Garden is the only botanical institution in the United States subscribing to a full set of the *Florilegium,* and one of only five libraries in the country to receive a set.

Gifts have been received from the Steinberg Charitable Trust and from the Sidney and Sadie Cohen Foundation, but additional assistance is needed to complete the purchase of this important publication. Persons interested in donating toward this project are invited to contact the Garden's Director, Peter H. Raven, or the Librarian James R. Reed. Donations for this purpose are tax-deductible. A list of all donors for the Florilegium will be maintained with the engravings.

—James R. Reed, Librarian

Volunteer instructors are needed to assist the Garden's Education Department. The expanded facilities available for the department in the Ridgway Center will create new opportunities for Members and others who are interested in teaching students of all ages. Interested persons should contact Judy Studer (577-5140) or Jeanne McGilligan (577-5187). There will be an orientation and training session in September ....

Wrigley Field moves to the Garden for two weekends in late summer, as the Theatre Project Company presents the nine-inning comedy *Bleacher Bums.* Performance of the play, about the (mis)fortunes of being a Chicago Cubs fan, are on Thursday through Sunday, August 26-29, and September 2-5. Members will receive a $1 discount on tickets. Call 531-1301 for information ....

Members and the public can continue to order roses from the Garden, selecting from more than 30 varieties displayed in the Anne L. Lehmann and Gladney rose gardens. Order forms may be picked up at the ticket counter ....

"Taxonomy has real importance. Not only does it create stability from chaos, but it allows biological disciplines to function properly. No effective ecological or physiological study is possible without a knowledge of which specific organisms exist in the systems of experiment." Milton Love in *New Scientist.* ....

Off Track Dancers will present "Summer Shade" at the Garden on July 31 at 4 p.m. The program features Rich O'Donnell, percussionist with the St. Louis Symphony. The performance is a blend of visual art, sound and movement. For information call 535-7576 ....

Watercolors and oils by artist Alan Suliber will be exhibited in the John S. Lehmann Building from August 2-27. Featuring paintings of Missouri plants and wildlife, the exhibit will be open Monday - Friday only, 9 a.m.-5 p.m ...

Henry Shaw was born 182 years ago this July 24. Members (especially our youngest members) are invited to celebrate with us on that day, from 10 a.m.-2 p.m. Refreshments, entertainment, and more ....

A grant for the Garden's work in Bolivia was awarded by the National Science Foundation recently. Beginning June 1, 1982, and continuing through November 30, 1985, the grant will support "A Floristic Survey of the Yungas Valleys of La Paz, Bolivia," now being conducted under the direction of Dr. James C. Solomon. Dr. Solomon is the Garden's William L. Brown Fellow; the position is provided by Pioneer Hybrid International and is named for their recently retired chairman. Dr. Solomon's work was described in the January/February, 1982, issue of the *Bulletin* ....

The Answer Service will provide plant clinics every Thursday evening, 4-7 p.m. beginning July 22, in the Ridgway Center. Members are invited to bring their problems pertaining to plant care; small specimens of problem plants may also be brought. Continues through October 14 ....

Green Thumb Sessions will also be conducted by the Answer Service on July 26-31, 1-2 p.m. A different topic on each day will be discussed by a panel of experts. See calendar for details ....

Notes

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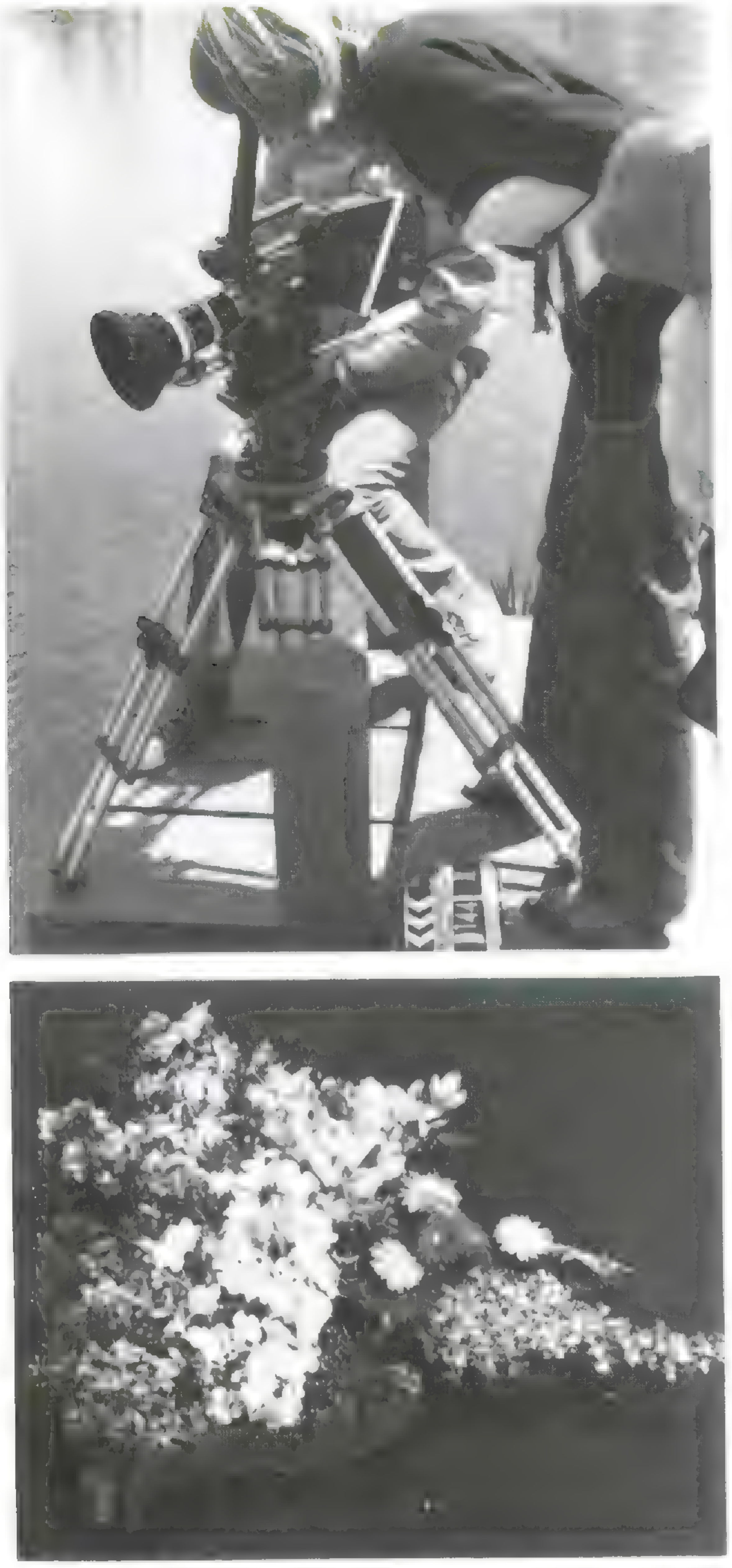


In late April, a film crew from the British Broadcasting Corporation visited the Garden to film an episode of Bellamy's America. Using the lake in the Japanese Garden, the production company demonstrated the theory of continental drift.

The 1982 Henry Shaw Cactus Society Show opens on August 28 at 1:00 p.m. in the Ridgway Center. Special opening ceremonies will include a ribbon-cutting by the Garden's Director, Peter H. Raven. The show continues through September 5; hours on all days except August 28 are 9 a.m.-7:30 p.m. . . . .

Brunch at the Garden will become a regular feature every Sunday in the new Gardenview Restaurant beginning in early August. Watch the mail for further information . . . .

Members are invited to a special preview of the opening of the Ridgway Center, Thursday and Friday, July 15-16, 5-8 p.m. There will be tours of the center and refreshments. Watch for further details . . . .

For Younger Members

What's in a Lawn?

Most lawns consist of several different kinds of plants. Clover, chickweed and plaintain are but a few, in addition to a number of varieties of grasses. Try taking a "census" with your child of just one small area of lawn. Find out what kinds of things live in that area.

You will need: an empty picture frame (glass removed), or four strips of cardboard glued in the shape of square, approximately 10″ × 12″; a note pad; a pencil; a small cup.

What to do: Have your child select an area of the lawn where the census will be taken. Place the empty picture frame down on the lawn. The area within the frame will be your census area. Find as many different varieties of plants as you can within this area. Use leaves and flowers as clues. Count the number of plants you find and write the number down on the note pad. Look for flowers on unmowed grasses — can you find any? Compare leaf sizes, shapes, arrangement and vein patterns on clover, chickweed and grass. Collect a few samples of the plants within your census area and place them in the small cup. Later you can press, dry, and mount them with white glue.

Be sure to notice any bugs or other animals that might be living within your census area. Just for fun, move your frame to another area of the lawn. Do the same things live there too?

— Ilene Follman
Education Consultant

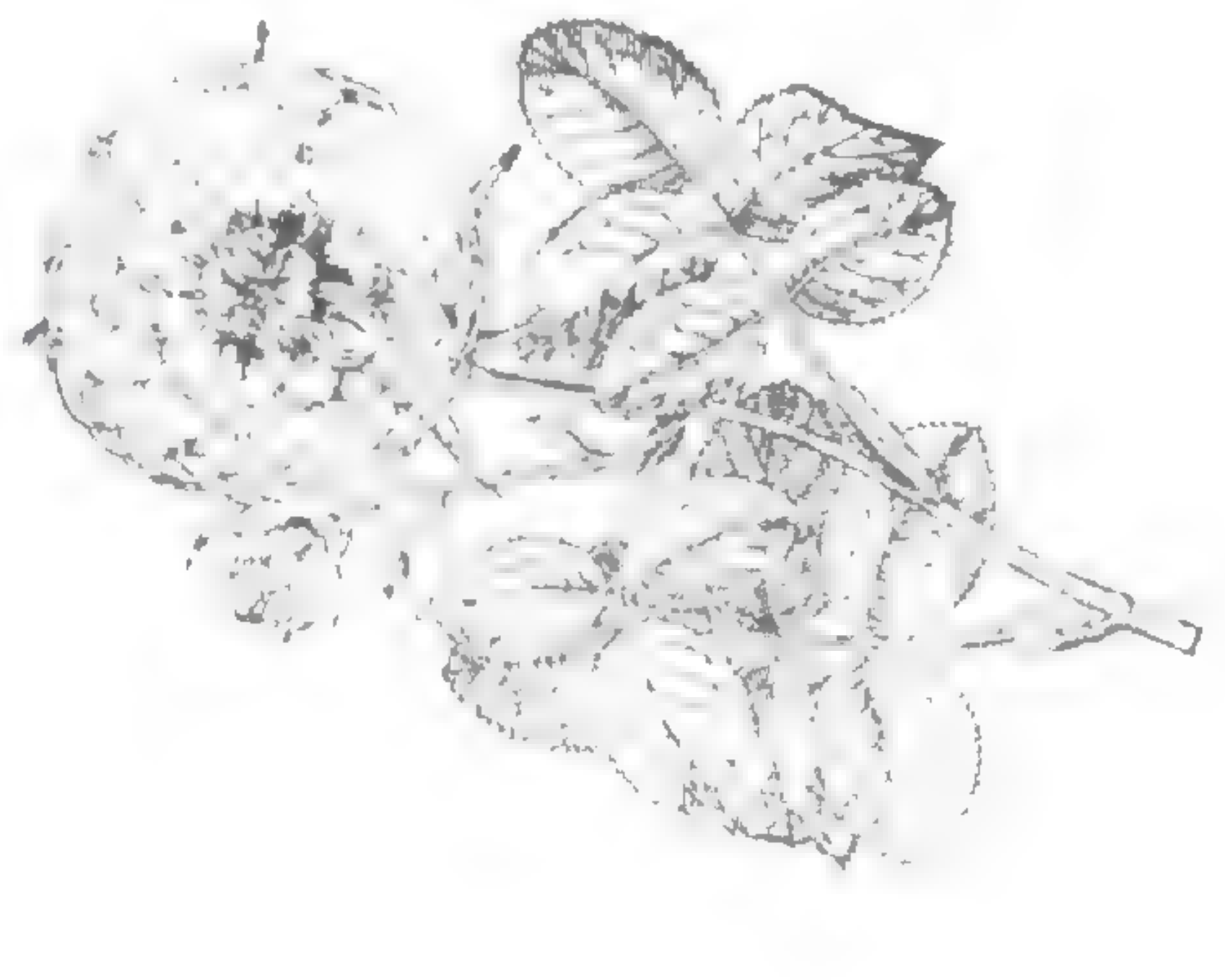
Books

Names and More

Who named the Daisy? Who named the Rose? is a delightful volume by Mary Durant, author of many other books and magazine articles. The nature lover, whose curiosity is not satisfied with identification manuals, will be pleasantly surprised.

Presented in dictionary format for easy reference, the book introduces us to each flower with a short history of its origin and travels to America, perhaps a few words on its namesake, its medicinal value, and, most pleasingly, some references to the flower in literature. Such persons as Hawthorne, Muir, and Meriwether Lewis tell of their encounters with everything from Artemisia to Witch-Hazel.

The cost for this hardcover journey through natures wildflowers? In an effort to better serve your interests, the Garden Gate Shop has recently opened a section of reduced price books, and as one of 50 or more titles, this book is only $1.98.



Vegetable Smarts

What's the latest in producing delicious summer vegetables? *Home Gardening Wisdom* by Dick and Jan Raymond. You'll soon be hearing about them on T.V. and radio spots but their book, along with a companion volume, *Down to Earth Vegetable Gardening Know How,* is here now.

With an easy to read and use style, the authors treat members of related crop groups from top to bottom. You just start out with a hankering for a particular vegetable and the Raymonds will help you choose a hybrid; germinate, harden off and plant it; prepare the soil and protect it from pests and diseases right up to the peak moment for harvesting.

So what now? You've got your hunger and you've got your vegetables. Do you just hand 'em over to the spouse and hope for the best? Of course not! The authors tempt your palate with every recipe from Hopping john to Green Pepper Jelly. Peas porridge to Potato bread. And — If you can't eat it all tonight, there are directions for canning, freezing, dry storing and, for onions, braiding.

For $9.95 I have the feeling Dick and Jan Raymond are going to be around for awhile.

— Judy Cuddihee, Garden Gate Shop

New Members

April & May 1982

Sponsoring Members

Mr. & Mrs. William S. Cassilly
Mrs. Herbert Frank
Mr. & Mrs. John R. Galloway
Mr. & Mrs. B. F. Jackson
Mr. & Mrs. Downing B. Jenks
Dr. & Mrs. Maurice J. Lonsway

Sustaining Members

Dr. Gladys E. Baker
Mr. & Mrs. Elmer C. Bartmann
Ms. Pauline Bauche
Mr. & Mrs. Harold A. Brinner
Mr. & Mrs. Ellis L. Brown
Mr. & Mrs. F. Carl Burt
Mr. & Mrs. Calvin Case
Mrs. C. C. Christy
Mr. B. Coombes
Ms. Vivian M. Coons
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Mrs. Keith Jackson
Mr. & Mrs. James Hudson Jones
Mr. & Mrs. Henry C. Kloepper
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Ms. Melissa K. Knox
Mr. & Mrs. W. R. Konneker
Mr. & Mrs. Milton Kushkin
Mrs. Raymond E. Lange
Mr. Gerald Lukefahr
Dr. & Mrs. Thomas F. Maher
Mr. & Mrs. Glenn M. McNett
Mrs. Kenneth Merten
Mr. & Mrs. Harold C. Mueller
Mr. & Mrs. James Myles
Mr. & Mrs. Ernest K. Newman
Mr. & Mrs. N. H. Nilson
Mr. John J. Nooney
Mr. & Mrs. N. M. Osborne
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Mr. William J. Pfeiffer
Mrs. Ralph F. Piper
Mr. & Mrs. Richard E. Platt
Mr. Joseph Pulitzer, IV
Mr. Edward Rehak
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Mr. Stanley Rolfson
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Mr. Brian Speicher
Mr. & Mrs. Leon P. Ullensvang
Dr. & Mrs. E. Vastola
Mrs. Hilda Voss
Mr. & Mrs. William L. Wheeling
Mr. & Mrs. Charles B. Wilkinson
Mr. & Mrs. Harry B. Wilson
Ms. Rosemary Wohlgemuth
Dr. Richard D. Yoder
Mr. & Mrs. William D. Zeltmann

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Mr. & Mrs. Thomas J. Anders
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Mr. & Mrs. Arthur E. Ansehl
Miss Bessie Van Antwerp
Ms. Ruth L. Ash
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Mr. & Mrs. Grady Balthrop
Mrs. M. B. Bauche
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Dr. Bernard Becker
Mr. Rudolph Benz
Mrs. Irvin Bettman
Mr. & Mrs. James Bieker
Mrs. Lavern Blair
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Mrs. Allen Burgess
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Mr. David S. Dickey
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(continued on page 14)

Tributes

April & May 1982

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New Members

(continued from page 13)

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Mr. John A. Works
Mr. & Mrs. David Worley
Mrs. Carol L. Wright
Mr. David Wright
Mr. Edward G. Wuller
Mr. & Mrs. Dupne G. Yadon

Calendar

July

July 1-10	**Family Picnic Day,** Grounds, July 4, 9 a.m.-7:30 p.m.
July 11-17	**Members' Reception,** Ridgway Center, July 15-16, 5-8 p.m.
July 18-24	**Ridgway Opening,** Ridgway Center, July 18 **Plant Clinic,** Ridgway Center, every Thursday beginning July 22, 4-7 p.m. (through Oct. 14) **Henry Shaw Birthday Party,** Grounds, July 24, 10 a.m.-2 p.m.
July 25-31	**Green Thumb Series,** Ridgway Center, July 26-31, 1-2 p.m....(Mon., *Vegetable Gardening;* Tues., *Lawn Care;* Wed., *Fruits;* Thurs., *Flower Gardening;* Fri., *Trees & Shrubs;* Sat., *Roses)* **Solanaceae Exhibit,** Climatron and Grounds, begins July 31, 10 a.m.-7:30 p.m. (through August 15) **Summer Shade,** by the Off Track Dancers, Grounds, July 31, 4 p.m.

August

August 1-7	**Alan Suliber Exhibit,** John S. Lehmann Building. August 2-27, Mon.-Fri., 9 a.m.-5 p.m. **Solanaceae Exhibit:** Continues
August 8-14	**Century Plant Exhibit,** Desert House, opens August 14, 10 a.m.-7:30 p.m. (through Sept. 11)
August 15-21	**Solanaceae Exhibit:** Continues **Alan Suliber Exhibit:** Continues **Century Plant Exhibit:** Continues
August 22-31	**Solanaceae Exhibit:** Final Day August 15 **Alan Suliber Exhibit:** Continues **Bleacher Bums,** by Theatre Project Company, Lehmann Rose Garden, August 26-29 (also Sept. 2-5) 8 p.m., except 2 p.m. on Aug. 29 **Cactus Society Show,** Ridgway Center, opens Aug. 28, 9 a.m.-7:30 p.m. (through Sept. 5) **Century Plant Exhibit:** Continues **Alan Suliber Exhibit:** Final Day August 27

Irony and Paradox in the Corn Field

amount of their growth energy in the production of seeds in order to ensure a subsequent generation and to preserve the species. Perennial plants, like *Z diploperennis,* exert their growth energy in the formation and strengthening of root systems, rhizomes, buds, stems and leaves. A single *Z. diploperennis* plant produces relatively very few seeds; commercial varieties of *Z. mays,* relatively many more seeds or kernals per plant.

The perennial nature of the plant however, has interested fuel producers. Standard Oil of Ohio is working with perennial corn developed from *Z. diploperennis* and *Z. mays* as biomass plant material to produce alcohol based fuel.

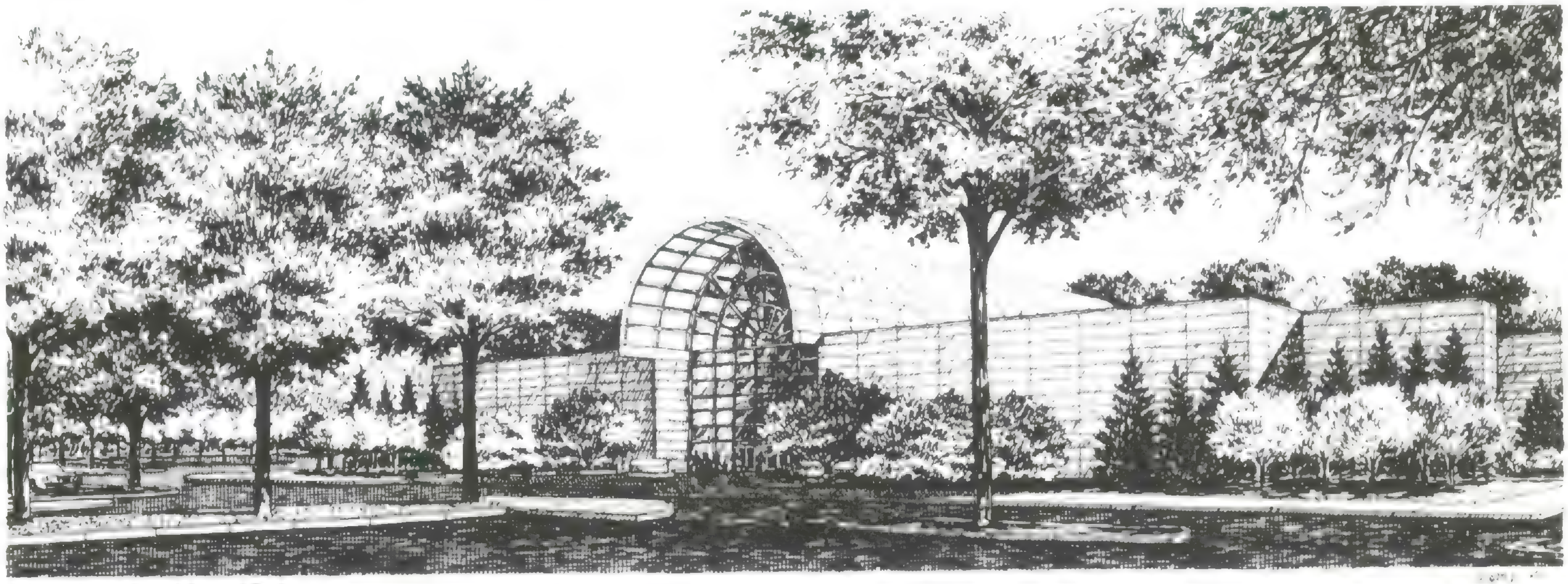
It appears, then, that the cause for the initial excitement over the discovery of a perennial that can be crossed with corn — namely that a perennial corn could result — has quieted, however, there still remains considerable value in *Z diploperennis.* First, of course, its immunity or tolerance to seven major corn viruses can be bred into corn. Second, agriculture researchers also hope that its stronger root system can be introduced into corn to help hold soil better against erosion. Third, there is a chance seen by some that a high yielding perennial corn can be developed by 2000, in which case the discovery would be invaluable and hold the "revolutionary implications" predicted when the new species was reported.

Fourth, and perhaps most important, the discovery of *Z. diploperennis* increases the known genetic stock of corn and its relatives. Cultivating a genetically uniform crop, in addition to increasing the danger of it being obliterated by a disease, also contributes to the reduction of genetic diversity. If a farmer — as many in Mexico do — cultivates a crop that is genetically diverse one year, and the next, in order to increase his yield, plants a modern hybrid, he reduces the range of genes in corn. Iltis and his collaborators have determined that *Z. diploperennis* grows only in a three-acre area. If before Guzman's exploration a farmer, or land developer, had cleared those three acres to plant a high-yield hybrid, there would have been no new species to find. All of the new opportunities this discovery has provided would not be possible.

Z. diploperennis and *Missouri Botanical Garden* are closely connected. The American scientist who first discovered *Z. perennis* in 1910, Albert S. Hitchcock, who was on the staff of the Smithsonian at that time, was a botanical assistant at the Missouri Botanical Garden and instructor in the Henry Shaw School of Botany at Washington University from 1889 to 1981. Dr. Hugh H. Iltis received his Ph.D from Washington University in 1952.

Persons interested in seeing *Z. diploperennis* and a perennial corn hybrid may do so by visiting the Demonstration Vegetable Garden in late August or early September. The display is part of the Garden's continuing effort to inform its members and visitors about the diversity of the world's plant life and its importance to man.

You Are Invited



Ridgway Center – Missouri Botanical Garden

THEATRE
Dance Lectures FILMS music
Sculpture CRAFTS BRUNCH ART
TOURS Flowers A Birthday Party
CHILDREN HISTORY Storytelling SCIENCE FOOD
FOUNTAINS CLASSES POSTERS Poetry

Ridgway Center Festival

July 18–October 15

Watch for details to come

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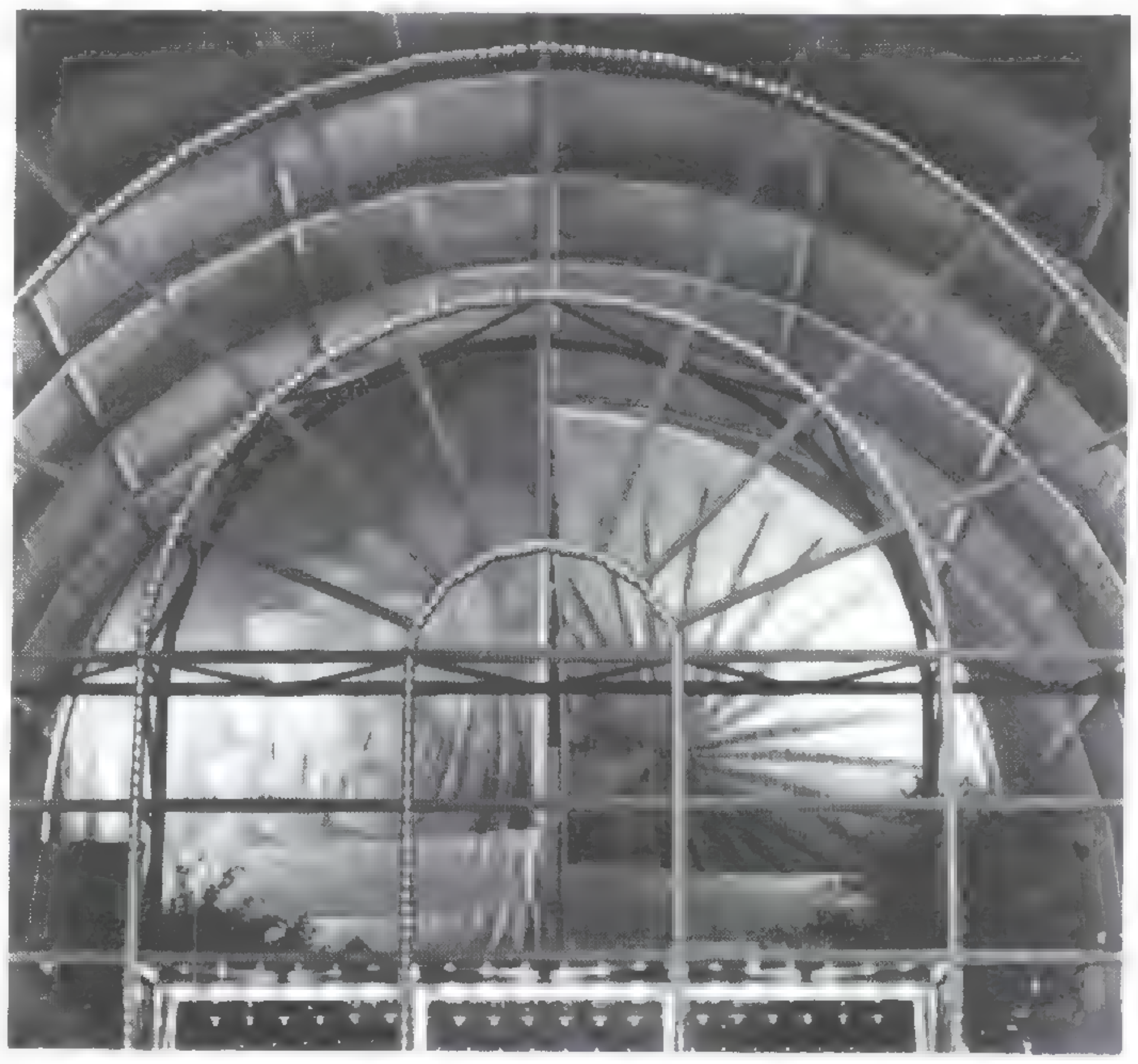
Missouri Botanical Garden Bulletin

Volume LXX, Number 5
September/October 1982

Victoria's Flower, Victoria's Building

As we open, it is 1803. Thaddäus Haehnke is canoeing the Rio Mamore with a Spanish missionary, Father LaCueva. Haehnke is a Czech botanist exploring Bolivia. The canoe comes alongside marshes and Haehnke sees perhaps the most extraordinary flower of his scientific career and does something that the priest has seen countless men do before: Haehnke falls to his knees.



Next we are in Buenos Ayres Intendency of the United Provinces of South America. It is 1821. Aimé Bonpland is on a raft near the forks of the Parana and Paraguay rivers, near Corrientes. His raft comes upon a large plant floating upon the water; the natives call it *Mays de l'Agua* (Corn of the Water)—they use its seeds in making flour, a flour they consider superior to that from *Mays.* Bonpland, a colleague of the great Alexander von Humboldt, leans too far out from his raft in his eagerness to collect a specimen of the plant and almost falls into the river. His associates later report that he spoke of nothing else for a month. Bonpland sends seeds to the Jardin des Plantes in Paris.

This plant that has brought one man to his knees, and another to the brink of falling from his raft has yet to be named formally or described as a new species.

(In 1833, Edward Poeppig, a German botanist, finally names and describes the plant. He calls it *Euryale amazonica* in an obscure journal, *Froriep's Notizen.* We note this in parenthesis because hardly anyone notices his publication and it is later decided that he has placed it in the wrong genus.)

We are now 2,000 miles, approximately, north of the Parana, in a place recorded on the map as British Guiana; It is 1836. If we look at a map drawn in 1982, we would not find Br. Guiana; in its place is Guyana. But it is 1836—late 1836—and it still carries the British name, and we are with Sir Robert Schomburgk. He is traveling the river Berbice, and with difficulty. There are rapids and cataracts which slow the journey; Schomburgk is deserted by some of his native workers and must leave behind one of his canoes; the river narrows, the difficulty increases; he encounters many trees fallen across the river and the journey slows even more; he is again deserted by more of his native workers; in five weeks, he has traveled only 120 miles.

And it is now New Years Day, 1837. The New Year, usually a time for celebrating, brings no joy to Schomburgk; it is only another mark of his slow progress, the possible failure of his expedition.

He speaks: "Such thoughts were passing in my mind when we arrived at a point where the river expanded and formed a smooth basin on its eastern bank... Something on the southern point of the bay attracted my attention; I could not imagine what it might be...a vegetable wonder. All calamities were forgotten; I felt as a botanist, and was rewarded. A gigantic leaf from five to seven feet diameter...rested upon the water; quite in character with the wonderful leaf was the luxurient flower...consisting of many hundred petals passing in alternate tints from pure white to rose and pink. The smooth water was covered with them, and I rowed from one to another, constantly finding something to admire."

Schomburgk gives the flower its first widely recognized name: *Victoria regia.* "I thought that a better name could not be chosen for the handsome and noble plant than that...given in honor of our illustrious Queen," he writes. This is in the first year of Victoria's 64 year reign; she is 18.

(*Victoria regia* is not quite right either as the name of the plant. Although it is more often—yet incorrectly—called *Victoria regia,* its correct name is *V. amazonica* because rules of botanical nomenclature demand that the earliest published specific epithet stand.)

Imagine a decade passing, and then two years more—all through those twelve years too, imagine horticulturists trying to coax *Victoria* to flower. Imagine them failing; she will not flower.

Now let it be England—thousands of miles of ocean from *Victoria's* home—in 1849. We are in a London train

(continued on page 4)

Comment

The defeat on August 3 of the sales tax proposal which would have provided revenue for economic development and for our cultural institutions was a disappointment for the Garden. Our Members, volunteers, and staff worked extremely hard for the approval of Proposition 1, and I am very proud of our efforts.

Proposition 1 was a bold proposal, and we owe our thanks to Vince Schoemehl, Gene McNary, and Chuck Knight, who spearheaded the campaign. The kind of leadership they have shown is in the final analysis why the St. Louis area will succeed despite occasional setbacks.

For the present, the Missouri Botanical Garden will remain one of the few major botanical gardens anywhere in the world without a base of public support for its operation. Even with the generosity of individuals and corporations, we have had to cut back our operation in recent years below desirable levels. We are now reviewing all the options available to us to insure the vigor of the Garden.

At the same time we are disappointed by the outcome of the vote on Proposition 1, we are celebrating a very important victory. The Ridgway Center adds new dimension and depth to the Garden's operation. With it, we will be able to provide more and better services to our Members and to the St. Louis community. I thank each of you for all of your support and work to make the Ridgway Center come about.

I look forward to working with you on the challenges and opportunities which the Garden faces in the months and years ahead.

Peter H. Raven

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Gardening in St. Louis

Drying Flowers, Ripening Tomatoes

The fall evening nip in the air reminds us that cooler weather is on its way. Preserving the summer and fall bounty of flowers, leaves, and certain fruits for arrangements for winter enjoyment is easy and rewarding. Many different techniques have been developed for drying plant material.

Flower Drying Techniques

- *Air Drying*—This is the simplest system to use. Tie bunches of stems of flowers or leaves with a rubber band. The drying area should be warm, dry, airy and, if possible, dark. Hang these flowers or leaves upside down in this area; it usually takes about ten days for the plant material to dry completely.
- *Micro-wave and Silica Gel Technique*—To retain the most vivid colors when you dry flowers, you will probably want to dry them using *silica gel* (available from any floral supply store or the Garden Gate Shop). If you want the quickest results, you can use a combination of silica gel with a micro-wave oven. This technique is used and recommended by the National Council for Therapy and Rehabilitation Through Horticulture.
- *General Instructions for Drying Flowers*—

1. Partially fill a large glass or jar with silica gel. Place a flower stem into the gel then slowly fill the remaining portion of the jar with gel. Be careful to place silica gel between all petals of each flower; use a toothpick to separate the petals. Cover the flower completely with gel.
2. Place jar in micro-wave oven. Place 1 cup of water in the left rear corner of the micro-wave oven. Heat in micro-wave oven on full power for one to three minutes, depending upon size of the flower. Longer heating times are required for larger flowers. (Check chart below for specific times.)
3. Use separate jar for each flower. Silica gel may be reused only after it is completely cooled. Remove flower from jar when it is cooled. (See chart below for standing time.)
4. After the standing time, slowly pour silica gel from the jar and carefully remove the flower. Gently brush any excess grains of gel from the petals or stem. Allow silica gel to cool before reusing.
5. Floral wire may be used to support stem. Artificial coloring may be added to the flowers when flowers are completely dry. Leaves should be dried separately and then added to stems.

Chart

Flower Type	Heating Time Full Power	Minimum Amount Standing Time***
*Carnation**	2½-3 minutes	5-10 minutes
Daffodil	1½-2 minutes	5-10 minutes
Pansy		
1st drying	45 seconds	5 minutes
2nd drying	1-1½ minutes	10 minutes
Rose	1½ minutes	2-5 minutes
Sunflower	1¾ minutes	1-1½ days**
Violet	1½-2 minutes	5-10 minutes
Zinnia	2-2½ minutes	5-10 minutes

*For best results dry three carnations at one time.

**Sunflowers should be covered with a plastic bag during standing time.

***You may wish to increase the standing time for some flowers.

Preserving Fall Foliage

You can enjoy beautiful fall-colored leaves for many months by preserving them for home decoration. There are several ways to do this depending on how you want to use them later in the season. If you want a natural looking leaf form, dry the leaves with silica gel. These leaves work well in dried arrangements. If you want flat leaves that you can hang or fasten to flat surfaces, press them between heavy books. Any brightly colored leaves will work well. No matter which way you dry the leaves (inside the books or with silica gel) never use them later in a humid place. You will end up with limp leaves if you do. It is better to dry them then save them until the winter to decorate your home. The humidity is lower in the winter than in the fall and the leaves will last longer.

- *Glycerinizing Foliage*—Glycerinizing foliage makes it permanent and perfect for dried arrangements. It usually turns the foliage a dark green or a shade of brown and gives the leaves a leather-like texture.

The first step in this procedure is to mix a solution of one part glycerine and two parts *hot* water. Split the stems two to three inches and place them four to six inches into the hot liquid; the heat starts the capillary action that causes the solution to be drawn into the stems and leaves. When the leaves have turned uniformly dark green or brown, they are properly conditioned. This time period will vary from two or three days to two weeks. After taking the stems out of the solution, hang them upside down. Take care to protect the floor area from dripping glycerine. Foliage you can try glycerinizing includes Mahonia, Leucothoe, Rhododendron, Laurel, and Beech.

Be sure to be selective in choosing branches to treat. Use this season's growth which is hardened and will not wilt. Do not use foliage which has been noticeably damaged by insects or diseases.

Turning Green Tomatoes Red

How frustrating it is to have tomato plants covered with nice, large, but green tomatoes. Here are a few pointers to help them ripen quicker:

1. Cut off the top foot of a few of your tomato plants. This will force all of the strength of the plant to go towards developing those green fruits (tomatoes are technically fruits) which are already on the vine.
2. Strip away a few of the leaves which hide the fruits from the sunlight. The sun warms the fruit and it is the warmth, not the light, that causes them to turn red.
3. Reach down to the base of the plant and give the base of the plant a gentle pull until you hear some of the roots snap. This shock treatment also causes earlier fruit ripening. *Until you have mastered this technique it is best to try it only on a few of your plants.*
4. Plan ahead for next year. Make a note to yourself to try some of the early fruiting varieties in combination with some of the varieties with which you have already had good results.

—*Steven A. Frowine, Chairman, Indoor Horticulture*

Victoria's Flower

(continued from page 1)

station shortly after dawn on August 3. A man named Joseph Paxton, returning home to Chatsworth from Scotland, disembarks. Paxton is head gardener at Chatsworth, the estate of the Duke of Devonshire.

From the station he goes to Kew where he receives a small *Victoria*. By nine a.m., three hours after he arrived in London, he is aboard another train, moving northwest through the English countryside toward Chatsworth. He carries with him a box holding the fragile and stubborn *Victoria;* his plant has five leaves, the largest of which is five and one-half inches in diameter.

He has built a home for *Victoria* at Chatsworth: a tank 12 feet square, three feet, four inches deep, with a water wheel that keeps the water moving gently like the river the plant knew as home. The tank is heated and lighted to imitate the tropics.

In the tank, the plant begins to grow — at one point at the rate of almost 650 square inches a day. Paxton's Duke, who is in Ireland, receives regular bulletins: By mid-September the leaves are three feet, six inches in diameter. By October 1, they are four feet, and by the fifteenth, four and a half feet.

On November 2, Paxton's bulletin reads: "*Victoria* has shown flower!... No words can describe the grandeur and beauty of the plant."

Paxton presents a flower to the Queen. "We were immensely pleased," she says. He continues to be rewarded for his attention to the *Victoria:* by September, 1850, it has produced 140 leaves and 112 buds, as well as seeds from which other plants are produced. All England hears of *Victoria;* the Duke says, "All the world comes to look"

Victoria outgrows the home Paxton has given her. He builds a new one. He explains his design — one that incites much attention because of its uniqueness — "Nature was the engineer," he says delivering a paper after the building is finished. "Nature has provided the leaf with longitudinal and transverse girders and supports that I, borrowing from it, have adopted in this building." Illustrating his talk, he shows his audience the underside of a five-foot diameter *Victoria* leaf, with its obvious venation.

Writing in the same year, botanist Richard Spruce observes, "When more closely surveyed, the leaves excited the utmost admiration for their immensity and perfect symmetry. A leaf, turned up, suggests some strange fabric of cast iron, just taken from the furnace — its ruddy color, and the enormous ribs with which it is strengthened increasing the similarity." Whether Spruce's and Paxton's observations were coincidental or whether Spruce was inspired by Paxton using the lily as his model for the ironwork in the structure of his greenhouse, we do not know.

London. It is 1849 and Prince Albert, husband of Queen Victoria, has announced that in two years, on May 1, 1851, a Great Exhibition of the Work of All Nations will open in Hyde Park; it will be the first international exhibition ever held. There is a competition for the design of the display hall to contain the exhibits and 245 architects respond with entries.

The Building Committee of the Royal Commission rejects all 245. It announces that it will construct its own design, which is a synthesis of some of the entries. When the plans are published, there is a general hue and cry; someone comments that it reminds them of a railroad station hybridized with a cathedral; the design requires 19 million bricks and more construction time than is available.

Paxton reads of the design and the public outcry and shortly thereafter attends a railway board meeting; an employee is being tried for a minor offense. Throughout the hearing he is observed making furious notes on a sheet of blotting paper — a sketch for the exhibition hall. It shows a building similar to his greenhouse; he has imitated the support work inspired by the *Victoria*. The building is to be of iron and glass, like the *Victoria* greenhouse, and will cover nineteen acres.

It is June, 1850, when he makes this blotting paper sketch; there are eleven months until the exhibition opens.

The Crystal Palace design was eventually accepted by the Committee despite initial resistance and was constructed in the alloted time: 46 weeks, even though there was a short labor strike during the time. The final dimensions were: Length — 1,848 feet; Width — 450 feet; Height — 66 feet. The barrel vault at the center of the building was 108 feet high.

In all, 4,500 tons of iron, 24 miles of Paxton gutter, and 600,000 cubic feet of timber were used. Nearly one million square feet of glass were manufactured for the Crystal Palace.

> *The Building itself — the fitting shrine for the objects of mingled beauty and utility which it encloses — is as original and novel as the occasion; and if the ancient peoples had advanced far enough in civilization, and had possessed wisdom enough to conceive such a project as this friendly rivalry of the industrious workers of all climes and races, this Building would have been commemorated by the history and tradition of three thousand years, in the songs of bards and in the proverbs of the people, as a wonder of the world, worthy to rank with the Pyramids, or with the gates and walls of Thebes or Palmyra for its greatness, and with the Colossus that bestrode Rhodes harbour for its beauty.*
>
> — *The Illustrated London News*, Exhibition Supplement, May 10, 1851

The Missouri Botanical Garden's new Ridgway Center is reminiscent of the great Victorian Crystal Palace. The *Victoria amazonica* venation, inspiration for Paxton's structure, is suggested in the Ridgway Center's barrel vault.

Victoria amazonica herself first came to the Garden in 1894, brought here by James Gurney, the man Henry Shaw had hired as his head gardener in 1857. Throughout the almost ninety years since she arrived here, *Victoria* has been a visitors' favorite, impressing them with her tremendous rate of growth (about an inch to an inch and one-half per hour at the peak) as well as her final size (the leaves of the *Victoria* grown at the Garden — actually a hybrid of *V. amazonica* and *V. cruziana* — now in the Victoria Pool between the Climatron and the old Main Gate, reach five to six feet in diameter. These hybrids were the result of work by George Pring, a Garden horticulturist from 1910–1963.)

There will be two exhibits at the Garden this fall for those interested in *Victoria* and the Crystal Palace. One, in the second level hall of the Ridgway Center, is a permanent exhibit on the history of *V. amazonica*, the Crystal Palace, and the Missouri Botanical Garden. The second exhibit, opening on September 4 and continuing until October 3, is of living *Victoria* waterlilies. Found in and near the lily pools east of the Climatron, the exhibit also includes interpretive material.

Three New Trustees Elected

Three St. Louis area business and community leaders have been named to serve on the Board of Trustees of the Missouri Botanical Garden, it was announced by C.C. Johnson Spink, Board President.

Elected to the Board of Trustees effective June 16, 1982, are: William H.T. Bush, Chairman and Chief Operating Officer of the Boatmen's National Bank in St. Louis; Stephen H. Loeb, President of Alvey, Inc.; and Wayman F. Smith III, Vice-president-Corporate Affairs, of Anheuser Busch Companies, Inc.

Mr. Bush, a native of Greenwich, Conn., is a graduate of Yale University and has had a long and distinguished career in banking and financial management. He was named Chairman and Chief Operating Officer of Boatmen's in 1978 and currently serves on the Board of Directors of Boatmen's Bancshares, Inc.; the Boatmen's National Bank of St. Louis; the Covenant Insurance Group, Hartford, Conn.; the Valman Corp., Minden, Nev.; and the St. Louis Regional Commerce and Growth Association.

Mr. Bush is also active in a number of cultural and community organizations, serving as a trustee of St. Louis University, the Repertory Theatre of St. Louis, the St. Louis Symphony; the St. Louis Area Council, Boy Scouts of America, and St. Peter's Episcopal Church.

Mr. Loeb, a St. Louis native, is a graduate of Country Day School and Princeton University. He joined Alvey, Inc. — manufacturer of automated materials-handling systems — in 1961, and served as Vice-president/Administration and Executive Vice-president before being named President of the company in 1972.

Mr. Loeb is a director of Commercial Bank and is Vice-president of Renard Linoleum and Rug Company. He serves as Director of the Bi-State Chapter of the American Red Cross and as Co-chairman of the Special Gifts Division of the 1982 United Way Campaign.

Mr. Smith, also a St. Louis native, is a graduate of Monmouth College in New Jersey and holds a J.D. degree from Howard University School of Law, Washington, D.C. Since 1966 he has been in the private practice of law as a partner in the St. Louis law firm of Wilson, Smith and McCullin. He has served as private legal counsel to Anheuser-Busch and was named Anheuser-Busch Vice-president-Corporate Affairs, in 1980. He serves also as a member of the Board of Directors of Anheuser-Busch, Inc.

Mr. Smith serves as a member of the St. Louis Board of Aldermen, representing the 26th Ward in the City of St. Louis. He has been a Municipal Court judge, and has served as Director of Conciliation for the Missouri Commission on Human Rights.

"My wife and I have enjoyed the Garden immensely since moving to St. Louis four years ago. It's a great honor to be elected to the Board; the Garden is one of the most prestigious institutions in the country. I'm pleased to serve."

—William H.T. Bush

It is well known what a tremendous institution the Garden is for people in St. Louis; beyond that, however, its involvement in tropical research has even greater, far-reaching benefits for mankind. I am looking forward to being a part of an organization that provides such a necessary and unique service to St. Louis and the world in general."

—Stephen H. Loeb

"The Garden is one of the city's most important resources. It's, frankly, a jewel in the middle of St. Louis, I was flattered by the opportunity to join the Board of Trustees."

—Wayman F. Smith III

RIDGWAY CENTER OPENS: July 18, 1982

(l. to r.) E. Arthur Bell, C.C. Johnson Spink, Peter H. Raven

In honor of the Ridgway Center dedication, held on Saturday, July 24, 1982 (Garden founder Henry Shaw's 182nd birthday), Kenneth J. Rothman, Lieutenant Governor of the State of Missouri, issued a Declaration of Recognition, which read in part:

"By this declaration of recognition I do hereby recognize the Missouri Botanical Garden for playing a leading role in the advancement and appreciation of the plant world through exhibitions, education, and research and I commend the Missouri Botanical Garden for its most recent accomplishment, the Ridgway Center."

"We are here today to conduct formal opening ceremonies for the Ridgway Center, the Garden's new education and visitor orientation building. In a sense, in fact, we're here to give the building away — to present it formally to the people of the St. Louis area who built it and to those it will serve during the next 123 years of the Garden's service to its community."

— Peter H. Raven
Director, Missouri Botanical Garden
July 18, 1982

"The Ridgway Center is not a monument or a static display, despite its beauty and its historical importance. It is a tool, a life-style resource, and it is as such that we present the Ridgway Center to the people of the St. Louis area today. Everything in the Ridgway Center is designed to help the Garden do a better job in the most critical task of its daily life — contributing to the worth and the enjoyment of the daily lives of hundreds of thousands of St. Louisans and visitors every year. That's why it is entirely appropriate that we give this building away at the moment it is opened. I hope each of you will accept this gift."

— C.C. Johnson Spink, President, Board of Trustees
July 18, 1982

"The Missouri Botanical Garden has grown from being a child of the Royal Botanic Gardens, Kew, into one of the few great botanical gardens of the world. No one is more pleased or more proud than its parents.

"Missouri is now as much an inspiration to Kew as Kew was to Missouri in the past.

"The Ridgway Center which we are now dedicating is not only a splendid and beautiful building, it is also tangible proof of your commitment to the plant world.

"In building the Ridgway Center you have shown that you understand these needs and I know that the educational programs which these new facilities will provide will instruct and give pleasure to very many who might otherwise be ignorant of the fascinating world of plants and completely unaware of man's total dependence upon it."

— Ernest Arthur Bell
Director, Royal Botanic Gardens, Kew

Ernest Arthur Bell, Director of the Royal Botanic Gardens, Kew, was the featured speaker at the dedication of the Ridgway Center on July 24, 1982.

Peter H. Raven, John Temporiti of the Office of the Mayor of St. Louis, Mrs. Anne L. Lehmann, and C.C. Johnson Spink at a luncheon honoring Mrs. Lehmann in the Gardenview Restaurant. The proclamation from Vincent C. Schoemehl, Jr. declares Wednesday, June 14, 1982, as Anne L. Lehmann Day in recognition of her support of the Garden.

For persons interested in the architectural heritage of the Missouri Botanical Garden, from the construction of Tower Grove House to the completion of the Ridgway Center, the Garden has recently published *In the Light of the Crystal Palace.* An attractive booklet containing 20 photographs or illustrations, and three maps, with text by the Garden's head librarian James Reed, it is available in the Garden Gate Shop for $1.95. (Members receive a 10% discount.)

The Ridgway Society of the Missouri Botanical Garden is a forum for the discussion of issues and an organization for the planning of lectures, seminars, and other activities of interest to persons new in St. Louis or those at the beginning of their careers. Further information on the Ridgway Society will be announced shortly.

TROPICAL WONDER: New Restaurant Features Mural

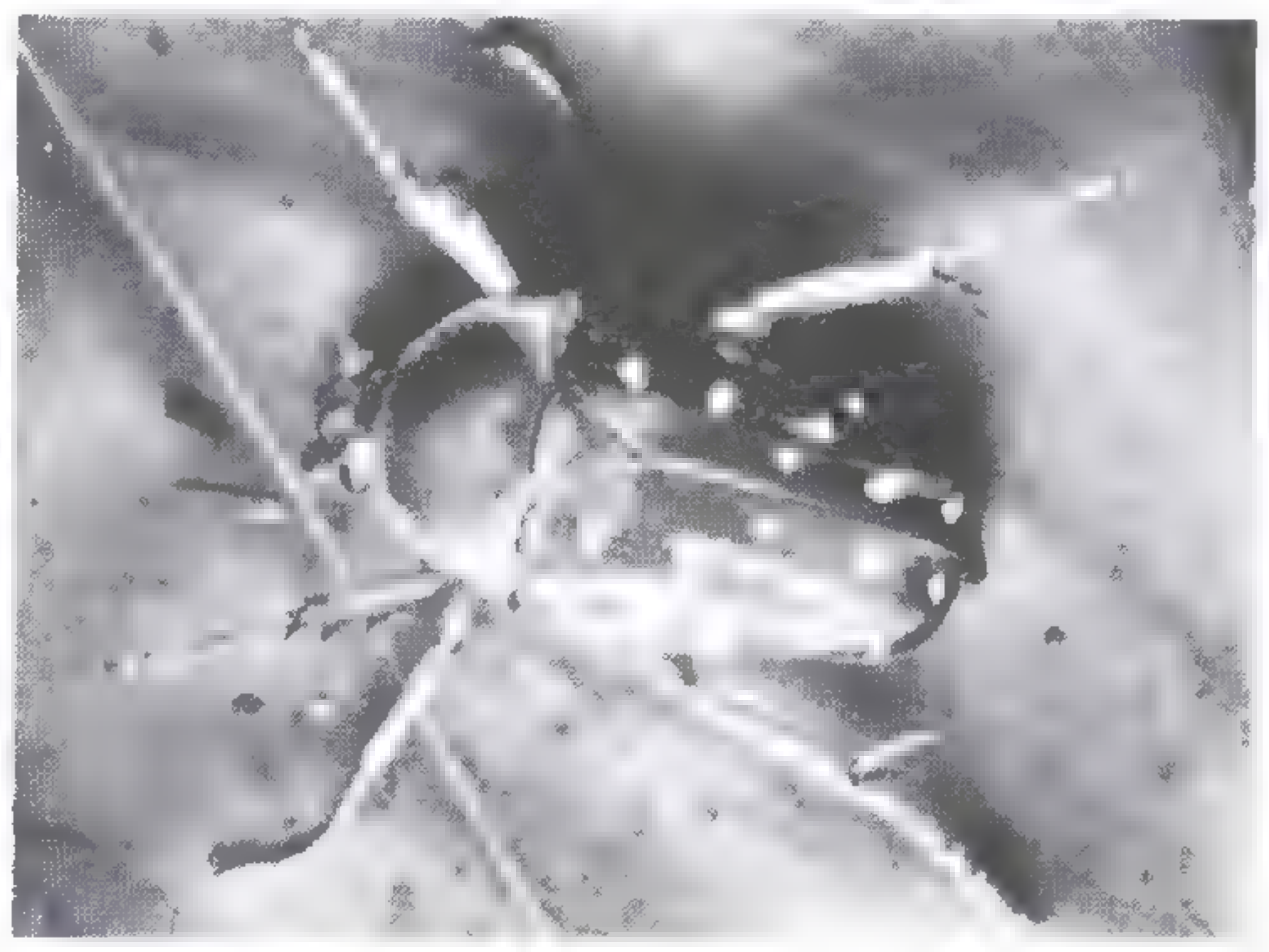
In the Gardenview Restaurant of the Ridgway Center is a mural of 72 photographs of tropical rainforest life—from a NASA satellite photograph showing an area of approximately 150 square miles to the nymph of a beetle. The mural was designed to show the beauty and diversity of the tropics and to call attention to the Garden's tropical botany program, the most active in the world.

Several thousand photographs from 22 sources were studied by the mural's designers, Hellmuth, Obata, and Kassabaum (also the architect for the Ridgway Center) who made a preliminary selection of 250. Together with members of the Garden's staff, the designers chose the final 72 photographs from those 250. Almost one-third of the photographs are by Kjell Sandved, photographer for the Smithsonian Institution.

The Gardenview Restaurant, a gift of long-time Garden supporter Anne L. Lehmann, features Sunday brunch, and daily lunch, dinner and snacks.

Mushroom (Mycena) by Kjell B. Sandved. (Photographed in Brazil)

Mantis by E.S. Ross. (Photographed in Zaire)



Cetonid Scarab beetle by E.S. Ross. (Photographed in Borneo)

Woodnymph hummingbird by Walter E. Harvey Photo Researchers. (Photographed in Brazil)

"I say, in general, that the trees of these Indies are a thing that cannot be explained, and the earth is so covered with them in many parts, and with so many differences and dissimilarities between them, that not even the native Indians know them, nor know how to give names to the majority. And in many parts one cannot see the sky from below the woodlands (for their being so tall, and thick and full of branches) and in many places one cannot walk between them; because besides their thickness, there are other plants and herbs so interwoven and twined about them that it is only with much effort and by force of knives and axes that it is possible to open a path. And in this respect one could say that this is a Great and Dark Sea; *because though part is seen, much more is not,since their names and properties are unknown, as I have said. Some have fruit and others flowers and others burst into growth and each kind enjoys the season in its own way and one may see every stage of development at a given time and during any part of the year." —Gonzalo Fernandez de Oviedo y Valdes (1535)*

From Gardenview Restaurant mural

To celebrate the opening of the Ridgway Center, the Garden's horticulture staff created a floral peacock and shipped it to NBC's TODAY *Show. The peacock, made of iris, statice, marigold, carnation, and chrysanthemum, was featured on the program on July 16*

W. Ashley Gray III, volunteer Curator of Purple Martins, installed a "Purple Martin castle" earlier this summer in anticipation of attracting more of these popular, beneficial birds to the Garden. . . . .

The Garden's Director, Peter H. Raven, was recently elected Vice-president and President-elect of the American Institute of Biological Sciences. AIBS is a scientific association for the advancement of biological, medical, and agricultural science. Dr. Raven received the Institute's Distinguished Service Award in August, 1981. . . . . . .

Dr. Raven was recently awarded an International Environment Leadership Medal from the United Nations Environment Program. Presented in celebration of UNEP's first decade and the 10th anniversary of the Stockholm Conference on the Human Environment, the medal recognizes a "distinguished contribution to the cause of the environment" over the last decade. Raven was one of 16 Americans to receive the award . . . .

Tom Economou, an expert in tropical fruit, will present a lecture at the Garden on November 3, 10:30 a.m. and 8:00 p.m.. . . . .

The Garden's library, along with the library of The New York Botanical Garden, has been awarded a grant of $225,042 from the U.S. Office of Education under its Strengthening Research Library Resources Program. This funding will enable the two libraries to continue their shared cataloging program through OCLC, Inc., a nationwide computerized library network. . . . .

The St. Louis Herb Society has given the library a gift to help strengthen its collections of books on herb gardening, herb lore, medicinal plants, and cookery. The Herb Society's library is housed as a special collection of the Garden's library in the John S. Lehmann Building in order to increase its availability to members of both the Herb Society and of the Garden. . . . . .

Bromeliads will be featured in a Climatron exhibit from September 11 through October 10. Cultural information prepared by the Garden's horticulturists will be available for those interested in growing bromeliads. . . . . .

Shaw Medal to Paul Kohl

(l. to r.) Peter H. Raven, Paul Kohl, C.C. Johnson Spink

Paul Kohl, a member of the Garden Staff for 62 years, received the Henry Shaw Medal in early July. Mr. Kohl, who graduated from the Henry Shaw School for Gardening in 1917, was appointed Floriculturist in 1920. In 1927 later he began 40 years of designing the Garden's popular flower shows. In 1970 he started working part-time as an Answerman.

Presenting the Medal to Mr. Kohl, C.C. Johnson Spink, President of the Board of Trustees, said, "It's difficult — no, I'll say impossible — to figure what the Garden would be today had not this man cared so much for it and given so much of himself to it.

"After this presentation, people will report that the Missouri Botanical Garden honored Paul Kohl today, but I think it is actually we who are honored. Honored by his 62 years of dedication, by his love of the Garden and we are honored as well to ask him to accept this Henry Shaw Medal."

Previous recipients of the Henry Shaw Medal include Dr. Julian K. Steyermark, Anne L. Lehmann, and B.A. Krukoff. S. Dillon Ripley, Secretary of the Smithsonian Institution will receive the Medal at the Henry Shaw Associates Dinner on November 18.

Secretary Ripley To Speak at Shaw Banquet

S. Dillon Ripley, Secretary of the Smithsonian Institution, will receive the Henry Shaw Medal and will be the featured speaker at the annual banquet of the Henry Shaw Associates of the Missouri Botanical Garden, November 18, 1982. The banquet is held each autumn to recognize the leadership in support of the Garden provided by the Henry Shaw Associates.

Secretary Ripley, internationally recognized for his administration of the Smithsonian and his work in zoology, assumed his current position in 1964. In the past 18 years, his philosophy that the museum experience should "be a practical annex to the bookbound education offered by schools" has guided the Smithsonian's work and has increased the stature of the institution both in the U.S. and abroad.

Under his direction, the Smithsonian has emerged as a national center for the arts as well as science. It has also completed the $40 million, three-block-long National Air and Space Museum, which attracts close to one million visitors each month. The combined attendance for all of the Institution's museums is 24 million each year.

Individuals interested in becoming Henry Shaw Associates, and in attending the banquet on November 18, should contact the Garden's Development Office at 577-5120.

Leonard Hall To Give Greensfelder Lecture

Leonard Hall, nationally known author and Missouri's most widely read nature writer, will deliver the 1982 Greensfelder Lecture, *The Sassafras Tree*, on October 22 in the Shoenberg Auditorium of the Ridgway Center. Mr. Hall will receive the Albert P. and Blanche Y. Greensfelder Medal at the November 18 Henry Shaw Associates Banquet.

For more than three decades Leonard Hall has been a contributer to the *St. Louis Post-Dispatch* and the *St. Louis Globe-Democrat,* writing about conservation, natural history, and country living. His popular books include the Ozark classics *Stars Upstream* and *Journal of the Seasons;* his articles have appeared in *LIFE*, *Audubon*, and *Harpers*.

The Greensfelder Medal was established in 1980 in memory of Albert P. and Blanche Y. Greensfelder to honor persons who have made contributions to landscape, garden and park planning, and designing for urban improvements. Previous recipients are Wayne C. Kennedy and August A. Busch, Jr.

The Greensfelder Lecture on October 22 is open to the public.

Notes from the Garden

A small but potentially fascinating project has been the propagation, by members of the Boxwood Society of the Midwest, of 24 plants of eight different *Buxus* cultivars for shipment to China. The plants are being sent from the Missouri Botanical Garden to the Nanjing Botanical Garden, a part of the Jiangsu Botanical Institute, Nanjing (Nanking), China. The Missouri Botanical Garden and the Nanjing Botanical Garden are "sister gardens," a relationship which began in 1979 following a visit of Professor Sheng Cheng-hui to St. Louis as a member of a Chinese delegation. Subsequently, Nanjing has become the "sister city" of St. Louis. . . . .

Garden Members are invited to join a Garden-sponsored tour to Costa Rica and Panama during January, 1983. Led by Garden horticulturist Steve Frowine and Tom Economou of Pathfinder Tours, the tour departs from St. Louis on January 19, and returns on January 30. For further information, Members should call Martha Jones of Sante Travel at 726-3040 . . . .

Three volunteers were honored at Volunteer Evening in June. Mary Jane Kirtz, currently co-chairman of the Guide Training Program, received the Award for Achievement for her research and authorship of "Sculpture at the Missouri Botanical Garden." The Award for Special Services was presented to Henry Bowman in recognition for his long and extensive work in horticulture and maintenance. Dan O'Gorman, was honored as Volunteer Emeritus. He was active as an Answerman until 1977; since then he has been a consultant to the Answer Service and has worked in several other areas in which assistance was needed . . . .

The third in a series of Landscape Design courses offered by the National Council of State Garden Clubs, Inc., will be offered on October 18, 19, 20, 1982 at the Ridgway Center of the Missouri Botanical Garden, 4344 Shaw. There are no prerequisites for this course. It is open to the public—homeowners as well as professionals in the landscaping field. For information call Glenda Finnie at 894-2655 . . .

Photograph by Rick Forrestal

Rick Forrestal's unique photograph of a carp banner (above) received a First Prize in the Japanese Festival Photography Contest sponsored by Japan Air Lines and the Missouri Botanical Garden. Forrestal's prize was for the category of 18 and over, Black-and-White. Other First Prize photographers were Kenneth Hong (18 and over, Color) Jason Hawkins (under 18, Black-and-White) and Steven D. Dunsford (under 18, Color). Each received an award of $50 from Japan Air Lines. Honorable Mentions were awarded to Jerome Hawkins (18 and over, Black-and-White) and Robert Beck, G. Richard Fox, Deborah Herin, Joni Doyle, and Anacia Henleben (all for 18 and over, Color). The First Prize and Honorable Mention photographs will be exhibited in the Ridgway Center through September. . . . .

Peter H. Raven received the Gold Seal Award from the National Council of State Garden Clubs. The Gold Seal, the Council's highest honor, was given to honor Dr. Raven for his work in botany and in administering the Garden. Shown are: (left to right) Mrs. Carl A. Dahlgren, Past President of the Council; Mrs. W.J. Hedley, Past President; Dr. Raven; and Mrs. Francis A. Fink, President.

The Members' Preview of the 1982 Fall Flower Show will be on October 1. Refreshments will be available. Members will receive additional information in the mail. October 2 is the first day the Fall Flower Show will be open to the public. It continues through October 24. See Calendar for other news of exhibits . . . .

The **Three Graces,** *(shown here reflected in its pool) a bronze sculpture by Gerhard Marcks (1956) was lent to the Garden recently by Dr. and Mrs. Thomas S. Hall. The sculpture is located in the circular pool south of the Linnean House.*

Notes *(continued from page 9)*

The Mary Institute Class of 1932 recently held their 50-year reunion at the Garden.

Stapeliads, commonly referred to as carrion flowers or starfish flowers, will be the topic for a special lecture and slide presentation. Mr. D.C.H. Plowes, accomplished photographer and distinguished Natural Historian from Zimbabwe, will be speaking in the Garden Room of the Ridgway Center, October 12. The lecture is scheduled for 10:30 a.m. to 12 noon and will be repeated in the evening 8:00 to 9:30 p.m. It is free and open to the public . .

Life on Earth, David Attenborough's widely acclaimed series, will be shown at the Garden during September and October. Even if you saw it on PBS previously, you will want to take this opportunity to see it, in all its magnificence, on a large screen. See Calendar for details. The book, *Life on Earth,* is available in the Garden Gate Shop. . . . .

From the Garden Gate Shop come these notes: The Fall Plant Sale will be held September 16–19, Members will have *two* preview days on September 16–17. Hours of the Plant Sale are from 9:00 a.m. to 7:30 p.m. Members can save 20% on all plants and materials carried in the Plant Sales portion of the Garden Gate Shop. The Sale is tentatively scheduled in the new Floral Display Hall in the Ridgway Center, but may be under a large tent on the parking lot if the Floral Display Hall is not yet complete. . . . .

A special thank-you to Betty Sims and Margaret Baldwin—buyers for the Garden Gate Shop. On Wednesday evening, July 14, Board Chairman C.C. Johnson Spink and Director Peter H. Raven presented two Garden plaques to these very dedicated Garden volunteers. Their efforts have been instrumental in the development of the Garden Gate Shop as one of the finest gift shops in the St. Louis area. . . . . . .

A great new selection of merchandise with the Missouri Botanical Garden logo is at the Garden Gate Shop. Choose from a necktie for $12.50, tennis hats for $12.00, belts for $16.00, tote bags for $22.50 and much more!!! You should see the great new postcards—a great thing to send a friend.

Don't forget the First Annual Fall Festival on October 8, 9, and 10. We will have a great group of craftsmen demonstrating and selling their wares. Also plenty of entertainment and food. Come to the Garden from 10:00 a.m. to 7:30 p.m. for all the fun. . . . .

"The unique world of the tropics: its people, plants, animals, and climate" the 1982 Fall Lecture series begins on Wednesday, October 6. Details will be announced. See Calendar for dates and times. . . . .

On September 1, 1982, luncheons in the Tower Grove House tea room will be $5.75. The tea room is open Tuesday and Thursday by reservations. Please call 577-5150. . . . .

"Brunch at the Garden" is now available every Sunday morning from 10:00 a.m. to 1:00 p.m. in the Gardenview Restaurant. Brunch is $6.95 and the menu is superb. . . . .

New Members

June & July 1982

Sponsoring Members

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Mr. & Mrs. John C. Steger
Mr. James A. Van Sant

Sustaining Members

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Miss L. Cella
Mr. Mike B. Comperre
Mr. & Mrs. Fredrick H. Eickhoff
Mr. George Faux
Mr. & Mrs. Norman Friedman
Mr. & Mrs. Ramon Gallardo
Dr. & Mrs. John J. Garrett
Mr. & Mrs. John A. Gragnani
Mr. Willis D. Hadley
Mr. Susan L. Heimburger
Mr. & Mrs. Leslie F. Loewe
Dr. & Mrs. Dan Luedke
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Mr. John J. Nooney
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Mr. Robert H. Quenon
Dr. & Mrs. M.S. Rao
Ms. JoAnne Rocklage
Mr. Paul D. Sander
Mr. & Mrs. Walter R. Stringer
Ms. Jo Goeke Vallo
Mrs. Hilda Voss
Mr. Sixto L. Wagan

Contributing Members

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Mr. Edwin F. Allsaier
Mr. Arthur J. Baisch
Mr. Kenneth R. Bender
Dr. & Mrs. Walter F. Benoist
Mr. & Mrs. F.A. Berger, Jr.
Dr. & Mrs. Harry Berland
E.M. Blackmore
Dr. John M. Blalock
Mr. & Mrs. James M. Blubaugh
Mr. & Mrs. J.S. Braden
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Mrs. Arthur Bux
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Mrs. Jill M. Clayton
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Mr. & Mrs. Jesse Colvin
Ms. Joan Corwin
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Mr. Richard A. Cutler
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Mr. & Mrs. Robert Haggard
Mr. Albert Halsband
Mr. E.A. Hancock
Mr. Chester Hart
Mr. Earl Heckel
Mr. Joseph F. Heidolph
Mr. Gary S. Heifetz
Ms. Mary Ann Hendel
Mr. & Mrs. A.L. Hess
Ms. Vera Hicks
Mr. Daniel Hopkins
Mr. Walter G. Hunt
Miss Rebecca F. James
Mr. Michael V. Janes
Mr. Joe R. Jeter
Mr. & Mrs. Gary W. Johnson
Mr. William Keslar
Dr. Stuart A. Kornfield
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Mr. William J. Kubat
Mr. Ervin J. Lang
Mr. James C. Lesher
Mr. & Mrs. Raymond E. Lorenz
Ms. Esther J. Luce
Mr. & Mrs. Matthew M. McCarthy
Mr. William E. McCourt
Mr. William B. McMillan
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Mr. & Mrs. Frank Mangles
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Mr. & Mrs. John F. Sisson
Mrs. Anthony Slay
Mr. Stephen G. Sneeringer
Miss Marie M. Soell
Mr. Ronald Stopplemann
Mr. & Mrs. Francis A. Stroble

(continued on page 11)

New Members
(continued from page 10)

Mrs. Leona Suhre
Ms. D. Nadene Taylor
Mr. John C. Theodorow
Mr. & Mrs. Gene Wehking
Mr. Joseph H. Vatterott
Mr. & Mrs. N.H. Wallach
Mr. & Mrs. W.E. Waller
Mr. John W. Waltz
Mr. & Mrs. Burton M. Wheeler
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Dr. & Mrs. Thomas A. Woolsey
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Mr. Paul A. Young
Dr. & Mrs. Sultan Zikryia

Tributes

June & July 1982

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Mr. & Mrs. Sydney M. Shoenberg, Jr.
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Mrs. Milton H. Tucker
Mrs. Wm. S. Bedal
Elizabeth Goltermann
Elinor T. Hayward
Florence Binder
Mort & Edie Binder
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Mitchell & Marie Grzesiowski
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Mr. & Mrs. Edgard L. Taylor, Jr.
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June & Harold Kravin
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Mr. Sam Singer
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Mrs. Leonard Strauss
Mrs. J.A. Jacobs
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Mrs. Minerva Primm Wharton
Mr. and Mrs. Daniel Schlafly
Mrs. Emma Weigert
Viola Villardi
Harriette Wolff
Virginia C. Culver

It is Open

Above: A special guest for the July 18 opening of the Ridgway Center was Garden founder Henry Shaw, plucked from a summer's day in 1859. Once past the shock of motorized vehicles, computers, and the splendor of the Japanese Garden ("a breathtaking sight and something even I never dreamed of," he said) Mr. Shaw enjoyed himself. "I'm very glad I can share in this proud moment," he said. (Henry Shaw portrayed by actor James Paul.)

St. Louis. July 18, 1982. 2:00 p.m.
The Garden's new Ridgway Center opened today.

Above: The first Garden visitors to enter the Ridgway Center on July 18, 1982.

At left: The Latzer Fountain at night. The Fountain, located just outside the south door of the Ridgway Center, was given in memory of Robert Louis Latzer. It will be the most prominent feature of the plaza which is scheduled for completion late this fall.

The Ridgway Center is the new visitor entrance to the Garden. It also contains, as Visitor facilities, the Shoenberg Auditorium, Spink Gallery of porcelain sculpture, visitor orientation theater, Garden Gate Shop, Gardenview Restaurant. A Floral Display Hall will open shortly.

Educational facilities include three classrooms, a teacher resource center, a multi-purpose room, an atrium, and an educational greenhouse.

Members will receive shortly a commemorative booklet describing both the visitor and educational facilities.

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SECOND CLASS
POSTAGE
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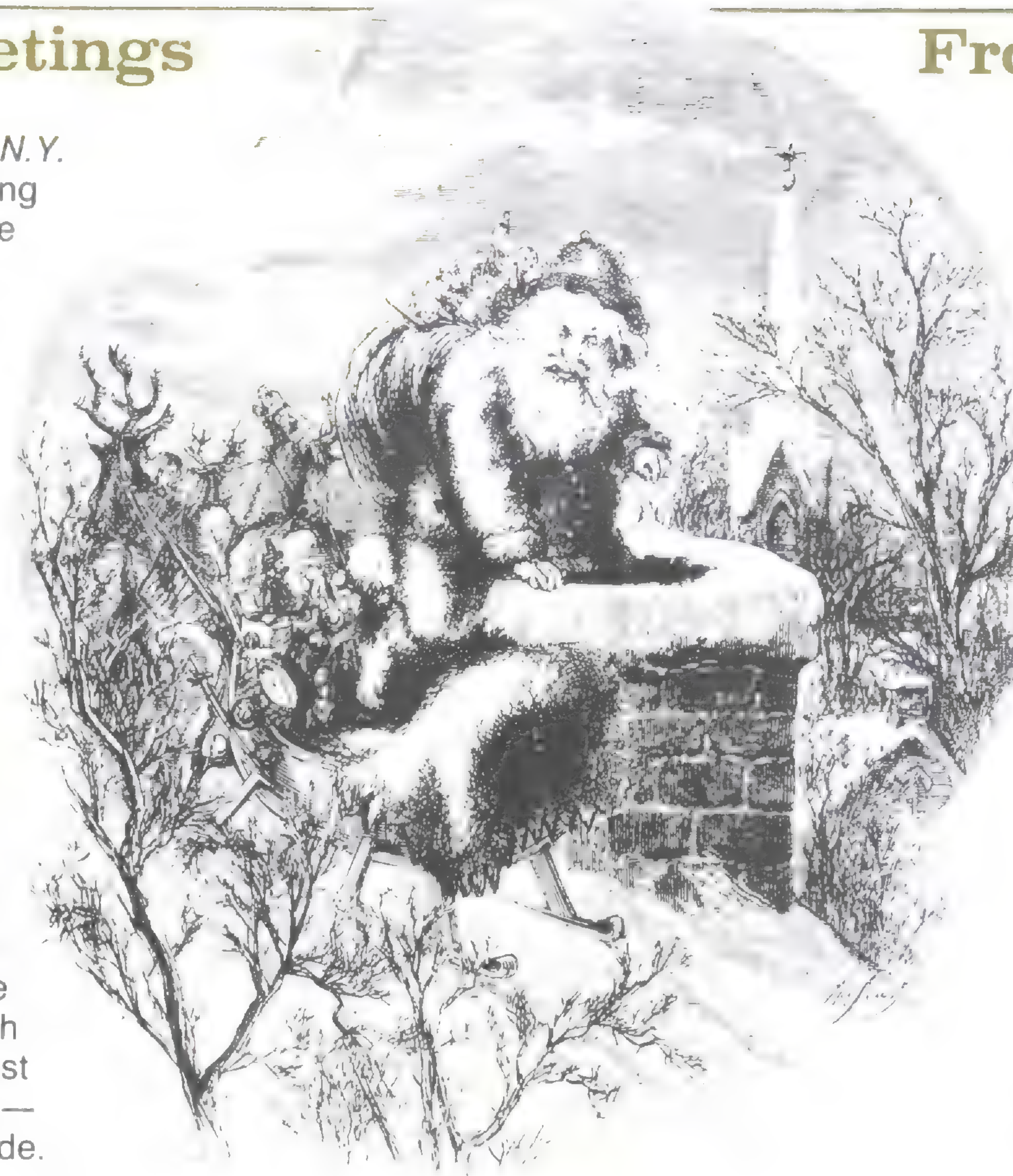
AT ST. LOUIS, MO.

Missouri Botanical Garden Bulletin

Volume LXX, Number 6
November/December 1982

Season's Greetings From Sarah Shaw



February 4, 1830 Pittsford, N.Y.

I tell you what fine sleighing we have had for the last three weeks; and what a delightful sleigh ride we had last week. 47 ladies and gentlemen mostly from this place rode over and partook of a splendid dinner provided for the occasion at the Hotel in Canandangua and returned by moonlight in the evening. I suppose you southerners know nothing of the pleasures of a sleigh ride.

December 25, 1834
Pittsford, N.Y.

A merry Christmas and a Happy New Year to you dear Henry . . . there was a fine snow last night and the sleigh bells have been jingling past ever since early this morning—now I do wish for a sleigh ride.

February 3, 1839 Rochester, N.Y.

It commenced snowing and blowing tremendously and here has never been such a storm in this part of the country hat any one can remember—the churches were open in the morning last Sunday but there were so few there . . . the drifts about our house were six feet deep and we could not stir out until Mr. Lathrop kindly got us two men to dig ways for us . . of course, there is too much snow for good sleighing. We must have two or three warm days to settle the snow and then t will be fine. At present it is very cold but we manage to keep very comfortable in the house.

The letters of Sarah Shaw, from which the above three excerpts were taken, are part of the collection of the papers of Henry Shaw held in the archives of the Missouri Botanical Garden. Including almost 13,000 letters, cancelled checks, nvoices, and notes on business transactions, the papers of Henry Shaw are a valuable resource for historical research and have been used by graduate students, architectural students, and authors of St. Louis histories, including James Neal Primm who wrote *Lion of the Valley: St. Louis, Missouri.* The January/February, 1983, *Bulletin* will feature a story about the Missouri Botanical Garden Archives.

December, 1982
St. Louis, Mo.

The era out of which Henry Shaw's sister Sarah wrote to her brother returns to the Missouri Botanical Garden on December 7-28. Tower Grove House, the completely restored country home of Henry Shaw, will be decorated much as it would have been in the Victorian age. Greens, boxwood, holly, juniper, and pine will be throughout the house. And displayed beneath the twelve-foot balsam Christmas tree in the North Parlor will be a collection of 19th Century dolls and toys loaned to the Garden by the Missouri Historical Society.

Four special Christmas luncheons will be served by the Tower Grove House Auxiliary on December 7, 9, 14, and 16. For reservations, please call Mrs. Coultas at 577-5150.

Season's Greetings From You?

A gift Membership in the Missouri Botanical Garden could be one of the finest presents you give to a friend or relative. Think of some of the other gifts you could buy for the same price ($30) and compare those to a gift that gives all year long; the winter, spring, summer, fall visits your friends can make to the Garden; the opportunities they'll have for lectures, educational programs; the special receptions; the discounts on gifts and plants in the Garden Gate Shop. If you'd like to give something special to someone this year and would like information on gift Memberships, call the Garden's Membership Office at 577-5118.

Comment

I am pleased to announce that, beginning in January, we will be offering our Members a new opportunity. All of our Supporting Members (those who contribute $60 or more to the Garden each year) will begin receiving a subscription to an extremely attractive bi-monthly publication, *Garden*, which is issued by The Garden Society, a consortium of institutions from across the country who cooperate to publish the magazine.

We are excited about presenting *Garden* to our Members for two reasons.

First, the magazine contains excellent feature articles about gardening and natural history; these are illustrated by many beautiful full-color photographs. Some recent issues have included articles about orchids of Australia, the Arizona-Sonora Desert Museum, the Amazonian forests, and the new Japanese Garden in Chicago. *Garden* regularly publishes reviews of the newest books of interest to gardeners.

Second, we are excited about bringing *Garden* to you because the publication is a cooperative effort of several of our country's finest horticultural societies and botanical gardens, including the Chicago Horticultural Society, the California Arboretum Foundation, the New York Botanical Garden, the Horticultural Society of the Indianapolis Museum of Art, and several others. *Garden* provides a chance for these organizations—and will now provide us with this opportunity as well—to exchange information and ideas with institutions that have similar goals and purposes.

Because *Garden* will arrive in your homes on about the first of January, and the first day of every second month thereafter, we will be delaying the mailing of our *Bulletin* by a few weeks each month. The January/February issue will arrive about the end of January.

If you are not already a Supporting Member but are interested in this exciting publication, *Garden*, please contact our Members' Office at 577-5118.

After you have received your issue of *Garden*, please feel free to share your comments with us.

Peter H. Raven

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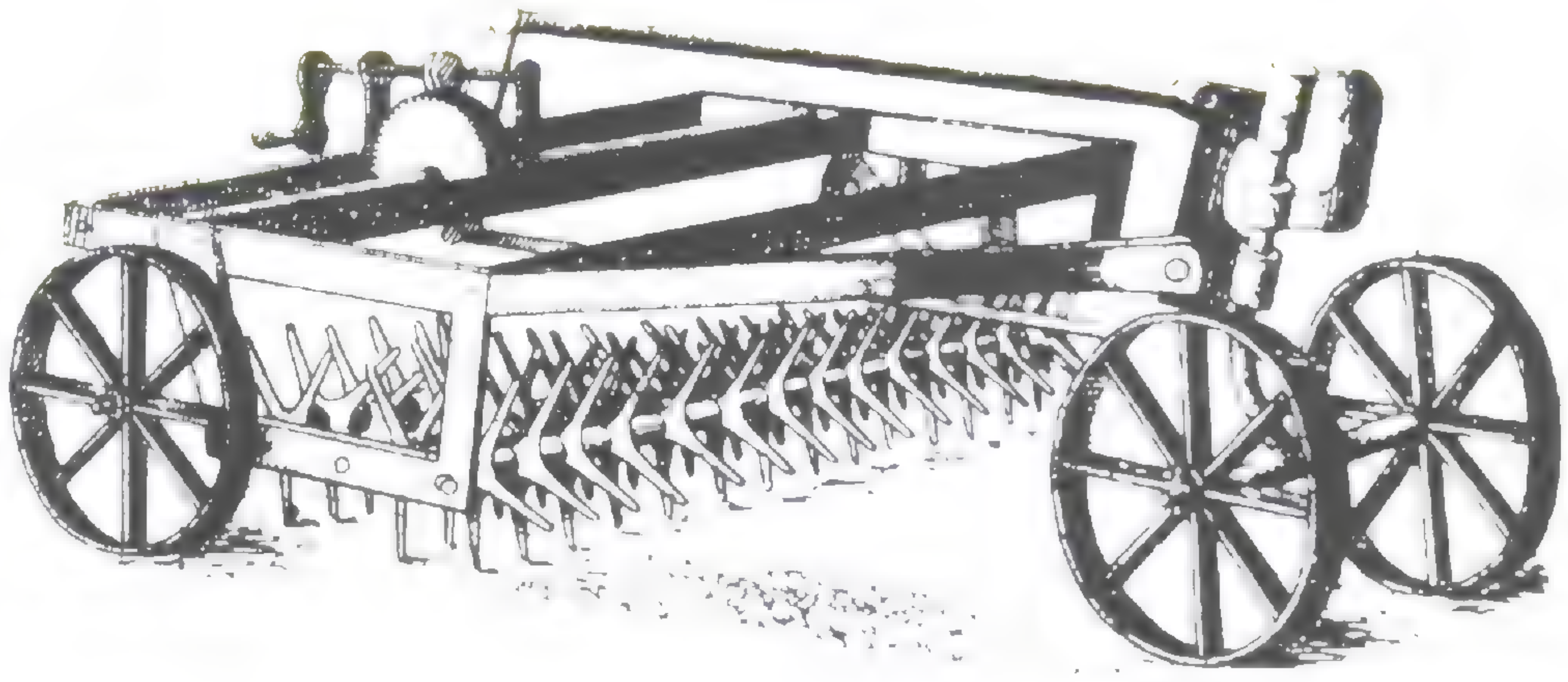
The **Missouri Botanical Garden Bulletin** is sent to every Member of the Garden as one of the benefits of their membership. For a contribution as little as $30 per year, Members also are entitled to: free admission to the Garden, Shaw Arboretum, and Tower Grove House; invitations to special events and receptions; announcements of all lectures and classes; discounts in the Garden shops and for course fees; and the opportunity to travel, domestic and abroad, with other Members. For information, please call 577-5100.

A Gardener's Christmas Wish List

Fine garden tools, which combine the qualities of beauty, function, and durability, are a rare find. They can make routine and sometimes arduous jobs easier. These tools are some of my favorites:

1. **Haws one-gallon watering can,** ($60.00) Sixty dollars for a sprinkling can?! That's right, and it's worth it. Haws of London has been making watering cans for about 100 years. This one is carefully balanced and crafted to perfection. It has a long spout so you can easily reach those plants in the back row and has a fine rose (watering head) to produce a soft spray of water. We use them in our greenhouse.
2. **Woodman,** ($5.95) Every good gardener knows that tools should always be kept clean and sharp. It is an unpleasant job to clean mud from shovels after you've used them and as a result it is frequently not done. Because of this, the tool rusts and is not suitable the next time it is needed. *Woodman* is the answer. It's a very well designed and sturdy tool scraper. This handy, solid-oak item has a leather strap and can be hung in the tool shed so you can find it easily when you need it.
3. **Felco Hand Pruners,** ($35.00-$39.00) These Swiss-made pruners are well crafted and are molded to fit your hand comfortably. Almost all parts are replaceable. Most of our horticulturists use them everyday.
4. **Trigger Grip Hand Trowel and Fork,** ($8.50, each) Most gardeners use these tools more than any others. The Trigger Grip Hand Trowel and the fork are works of art with function. Both of them are one-piece, hand-polished, cast aluminum; there are no parts to rust or to pull apart. They are molded to fit your hand and are constructed so your index finger can grip the tool. This is an especially important feature for arthritic gardeners.
5. **Nap-A-Ram Garden Gloves,** ($5.45) While most garden gloves are made of cowhide or cloth, these are made of goatskin which is superior to other materials. Goatskin remains supple after it becomes wet (cowhide becomes stiff), yet is much more durable than cloth. Because goatskin is a thin leather, it gives the gardener a more sensitive touch than most other cowhide or cloth gloves.
6. **Brookstone Pocket Pruner,** ($10.95) This handy, 5-inch stainless steel pruner is just the right size to carry in your pocket or purse and yet is substantial enough to cut flower and leaf stems. This is a favorite tool of our orchidist, Marion Pfeiffer. She carries one on her key chain.
7. **Smith and Hawken Heavy Duty Spade,** ($45.00-$49.00) A good spade is an essential tool for all gardeners and this one is probably the best on the market. It is not too heavy but very strong. The handle is solid American Ash and the blade is solid steel made with carbon and manganese so it is tough and long-wearing.
8. **Missouri Botanical Garden Apron,** ($12.00) There are many gardening aprons sold, but few have the good features of this one. It is tough (canvas) and attractive (navy blue with yellow MBG logo). The pockets in the front are handy and the length seems just right. If you need more convincing about this apron ask the people who work in the Plant Shop who wear it everyday.

(All of the above tools, and many other gifts of interest to gardeners, are found in the Garden Gate Shop.)



Poinsettias Are Not Poisonous

Just about every Christmas season brings with it reports of how children can be poisoned by eating "just one leaf of the deadly poinsettia." It is unfortunate that this spectacular holiday plant has been branded as a dangerous plant, especially since very thorough laboratory tests completed by Ohio State University in 1971 proved conclusively that poinsettias are *not* poisonous. The latex (white, milky sap exuded from broken stems or leaves) was fed in large quantities to rats, standard laboratory test animals. None of the rats, even those fed very high amounts of the latex, showed any signs of poisoning. Despite various stories of poinsettia poisoning which have appeared in the popular press, there has not been one medically documented case of such a poisoning. *(However, the latex is irritating to eyes and to the skin of some sensitive people.)*

As houseplants, poinsettias have been much improved. Today's hybrids come in colors from white to mary variations of red and pink. Their bracts, the colored leaves which are sometimes referred to as "flowers," are much larger and they maintain their color well past the Christmas season. As anyone who has received one of these plants knows, they are so tough that they seem to defy abuse.

To make them last the longest, keep the plants in a bright, cool (60-70°F) spot. Water them thoroughly when they need it, but be sure to let them dry out between waterings.

This Christmas season enjoy your poinsettias for their unique beauty and be assured that they are *not* poisonous.

Forcing Paperwhites for Christmas Bloom

Paperwhite or Soleil d'Or Narcissi in a bowl are perfect holiday decorations and gifts. If you would like to grow some indoors, here are some tips.

Fill two-thirds of the planting bowl with pebbles. Place bulbs, about 1 inch apart, on the pebbles and add water so it barely reaches the base of the bulbs. Then continue to fill the bowl to within two inches of its rim with pebbles. Set the container in a cool (50°F), dark area for two to four weeks for rooting.

After roots appear and the pale green shoots are 3 to 4 inches tall, move the pot to a sunny window where the temperatures do not exceed 70° Fahrenheit. Be sure to maintain the water level so roots are constantly covered with water.

To assure constant bloom, Paperwhites and Soleil d'Or Narcissi can be planted at two-week intervals starting October 1. Those started in early October will bloom for Thanksgiving; those started in early to mid-November will blossom for Christmas.

—Steven A. Frowine, Chairman, Indoor Horticulture

A Shrub with Bounce

Today some people wish they hadn't burned those thousands of acres of desert in 1945. Wishing that, they think of the 21 million pounds of rubber that, literally, went up as only so much smoke—enough rubber to put four new tires on 20% of the automobiles that Detroit produced that year.

What was burned 37 years ago, just after the end of the World War, was 27,000 acres of guayule (*Parthenium argentatum*), a squat, apparently common one-meter high, desert shrub of the sunflower family (Compositae). *Apparently* common, but not in fact. Guayule contains, in its stems, branches, and roots, about 15 to 20 percent of its dry weight as rubber.

Last year, the United States imported natural rubber at a total value of approximately one billion dollars. The U.S. annually consumes about 20% of the total world production. Most of this natural rubber is produced in Southeast Asia and comes from the rubber tree, *Hevea brasiliensis*, of the Euphorbiaceae family. The tree is actually native to South America (and was introduced into Asia in the 1800s), but a leaf blight early in this century devastated the western hemisphere stands of *H. brasiliensis*, leaving the Asian crop as the viable source for commercial production.

Now, for a number of reasons, government and rubber industry experts foresee a major shortage of natural rubber as early as the 1990s—a shortage of about one-half million tons per year.

The first reason is ironic: in the early 1960s, with a proliferation of predictions that synthetic rubber would totally replace natural rubber, many growers of *Hevea* cut back their production. But synthetic rubber has not replaced natural rubber. That produced on a large scale is inferior, for many purposes, to natural rubber. Many products, such as tires, still require a content that is partially or entirely natural rubber. Automobile radial tires, for example, are about 30% natural rubber. Airplane tires are entirely of natural rubber. (Although scientists have developed a synthetic rubber that matches, more closely, natural rubber, it has not been produced commercially.) Even if synthetic rubber of comparable quality would reach the market, experts agree that natural rubber would retain about 25% of the market.

Complicating the situation is the fact that synthetic rubbers are produced from petroleum by-products. With the unstable prices for petroleum, it becomes less and less economical to produce synthetic rubber. A second reason a shortage is anticipated is that, because of a world-wide concern for food shortages, still more growers of *Hevea* are reducing their replantings of the rubber tree, substituting food crops.

The world's supply of *Hevea* rubber becomes even more precarious given the political instability of Southeast Asia (in the 1940s, during much of World War II, the United States was cut off from 90% of its natural rubber sources) and the chance that the leaf blight which devastated the South American *Hevea* stands could be introduced into Southeast Asia.

In response to the continued world demand for natural rubber, and the predicted shortages of the next decade, and the general precariousness of the *Hevea* crops of Asia, the government and rubber industry have revived interest in guayule for the third time in this century.

At the beginning of the 1900s, guayule became a major source of American rubber and by 1910 provided about 50% of the rubber used in this country and 10% of that used in the world. However, this rubber was taken from wild (as opposed to cultivated) plants. Though the stands were extensive, they were soon depleted by the constant harvesting. (Rubber is taken from guayule by harvesting the entire plant: *Hevea* rubber is taken by tapping into the tree.) By 1912, guayule was no longer a viable commercial source of rubber.

Thirty years later, during the war, the government instituted, as one of its many war measures, the Emergency Rubber Project, under which 32,000 acres of desert was planted in guayule. By the end of the three and one-half year project, 15 tons of rubber were being produced daily. But when the war ended and access to *Hevea* rubber was regained, the government abandoned its ERP and destroyed 27,000 acres of guayule.

Interest this time arose in the late 1970s when the National Academy of Sciences concluded extensive investigation into guayule and recommended "a national commitment to guayule research and development." Responding to that, Congress passed the Native Latex Commercialization and Economic Development Act in 1978, setting aside $30 million for research into the plant's economic potential. The largest rubber companies in the United States have since begun the cultivation of several million guayule seedlings in southwestern American deserts.

Guayule Facts

Its scientific name is *Parthenium argentatum:* the specific epithet comes from its characteristic silvery sheen. It is a bushy perennial and can survive in the severe desert conditions for up to 50 years, where annual temperatures range from 0°F to 120°F. It develops a tap root that can penetrate 20 feet into the desert soil and an extensive system of roots that can spread 10 feet out from the center.

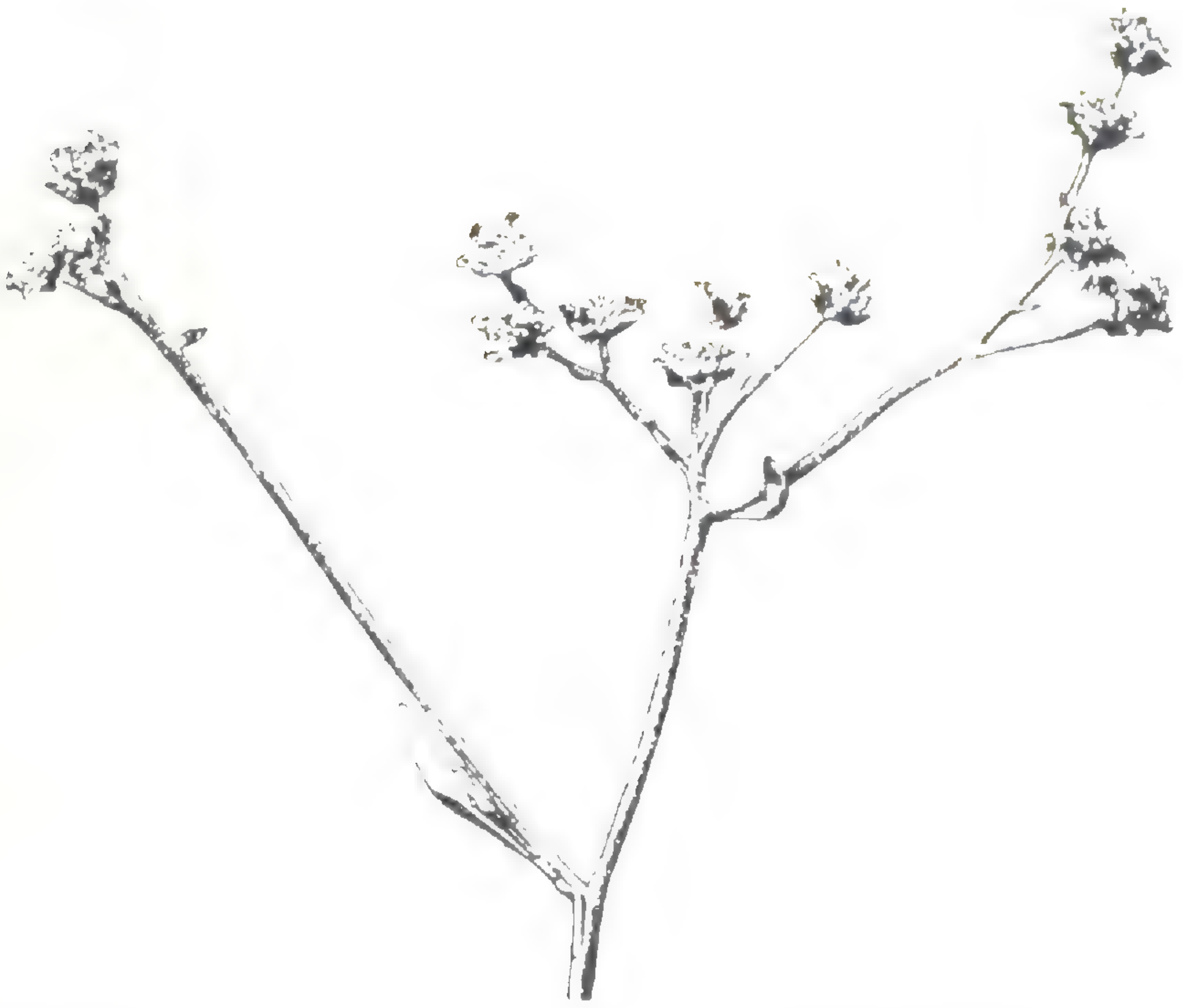
This system allows the shrub to absorb sufficient amounts of precious desert moisture.

In severe drought, as well as in times of extreme cold, guayule becomes semi-dormant. It is important for persons interested in guayule for its rubber that it is when the plant is stressed during these adverse conditions, and becomes semi-dormant, that its rubber content increases as its growth slows and the plant concentrates on rubber production.

This rubber—assessed by the 1977 NAS report as being virtually identical to *Hevea* rubber—forms within cells throughout the plant, with concentrations highest in the roots and stems. These cells, which are microscopic, are not connected to one another and so, for the rubber to be extracted, the entire plant must be harvested and the rubber separated from the other parts of the shrub. Current technology can recover about 95% of the rubber within any one plant.

An exhibit of guayule, with information and samples of the rubber, will be held in the Desert House from November 6 to December 5. This exhibit is part of the Garden's continuing effort to present to its visitors information about the plants important to man.

Keeping Track of 810090-1



When you come to look at the Guayule Exhibit in these next few weeks (see p. 4), you'll see, attached to the guayule plant by a piece of wire, a small zinc tag, about 1½″ x 3″. On the tag are the words *Parthenium argentatum* and a number, 810090-1.

Here are some facts about the plant you are looking at: It is on the north side of the Desert House (the side nearest the Climatron), and toward the middle of the house. Near it are planted *Agave attenuate* (cliff maguey) and *Celtis pallida* (desert hackberry). The guayule was sent, as seed, to the Missouri Botanical Garden from the University of California, Riverside. In California, it was collected near Moreno. The Garden received the seeds on January 15, 1981. They were sown five days later and germinated on February 27; 18 days after that five seedlings were transplanted into one of the Propagation Greenhouses. On November 3, 1982, one of those five seedlings was transplanted into the Desert House.

This information—the location of the plant, its history and source—was derived without entering the Desert House, without seeing the specimen. It was derived by looking at two pieces of paper: a 5″ x 8″ card and a map.

These two pieces of paper, and tens of thousands more, are in file drawers in the office of plant records at the Missouri Botanical Garden.

Every plant, seedling, and seed that is received by the Garden is catalogued here as was the guayule. In all, Audrey Thompson, who cares for the records, estimates that there are about 25,000 cards on file in her department, each card representing at least one plant, seedling, or seed that is somewhere in the Garden, whether in a display greenhouse, on the grounds, or in a propagation greenhouse.

The number on the zinc tag—in the case of guayule, 810090-1—is the accession number for the plant. Every plant received by the Garden has one of these numbers. Decoding it: the first two digits represent the year in which the plant was accessioned (81 for 1981). The last four digits before the dash represent the numerical order in which the plants for a particular year are accessioned: the guayule was the 90th plant recorded in 1981.

The number following the hyphen represents the number assigned a specific plant out of a single accession. Sometimes one accession includes only a single plant; often it includes more than one. In the case of the guayule, five seedlings came from the seeds given to the Garden by the University of California, Riverside, and those five seedlings were coded 810090-1 through 810090-5. In this way, accessions can be divided between several locations—in this case, one plant was installed in the Desert House while others remained in the propagation greenhouse—and the staff can still easily trace the origin of a plant through the first six digits of the accession number.

And then there are the maps, long sheets of paper, marked off in a grid of squares, and bearing the names of each plant in the Garden, whether on the grounds or in a display greenhouse. Again, considering the guayule: On its 5″ x 8″ card is the notation: Desert House, N-7. If we pull the map of the Desert House out of the tall cabinet in which all the maps are stored, some of them seeming impossibly long—since the opening of the Japanese Garden, the maps of it have been gradually increased to four times their original size in order to legibly bear the names of each plant in the area—and spread it open on a table, we can locate square N-7. (There are three alphabetical coordinates for the Desert House: N, for the north side, S, for the south side, and IS for the island near the rear of the house. There are 17 numerical coordinates.)

And there are maps for the other Garden areas: the Climatron, the Mediterranean House, the English Woodland Garden, and the others.

Leaving the office of plant records and walking through the grounds, we can find other evidence of the work done in that Department: the display labels affixed to the trees or standing midst a bed of flowers.

These labels tell us more than do the zinc tags: these give us the common name of the plant, the scientific name, the family, and its distribution. Soon, the labels will tell us even more than this. Some will be marked with a glyph: a silhouette of the state of Missouri. Plants marked with labels bearing this sign are those native to Missouri.

This is the second in a series of articles about areas of the Garden not usually seen by those who visit here. Persons interested in volunteering to work in the Plant Records Department, as well as in any Department in the Garden, should contact Jeanne McGilligan at 577-5187.

Garden Library Praised at National Meeting

The Library of the Missouri Botanical Garden was praised at the annual meeting of the Guild of Book Workers held in New York earlier this year for its Festival of the Book Arts, a four-month long series of exhibits, demonstrations, lectures, and workshops held at the Garden in the autumn of 1981. Those attending the annual meeting were urged to use the Festival as a model for future, similar events.

Because of the Garden's extremely active work in preservation of books (the Garden has the only institutional book preservation department in the state of Missouri) James Reed, Missouri Botanical Garden Librarian, was recently appointed to membership on the Education Committee of the American Library Association's Preservation of Library Materials section. During his three year term, Mr. Reed will work with other committee members to develop educational programs for librarians and others in the preservation of library materials, book binding, and related crafts.

Symposium Brings Together American, Chinese Scientists

Approximately 400 scientists were at this Missouri Botanical Garden on the last weekend of September for the 29th annual Systematics Symposium. Sponsored by the Garden, the Symposium has, for more than the last quarter-century, brought together scientists from across the world to discuss current work in systematics. At this latest Symposium, scientists attended from the People's Republic of China, Japan, Sweden, Canada, Mexico, Venezuela, and 38 states. The 16 scientists from the PRC represented the largest group of Chinese scientists ever to attend a botanical meeting held in the Western Hemisphere.

The topic for this year's Symposium was the relationship between the plants and animals of temperate Eastern Asia and temperate Eastern North America.

Dr. Gerrit Davidse, a botanist on the staff of the Missouri Botanical Garden and the coordinator of the last eleven Symposia, said that, important as was the scientific work discussed during the three day meeting, perhaps even more important were the new contacts made by scientists of the US and the PRC and the possibility of the beginning of several new programs of cooperation between the two countries.

For a number of years, the Missouri Botanical Garden itself has been working closely with institutions in the People's Republic of China to mutual benefit. Peter H. Raven, the Garden's Director, has been coordinating exchange efforts for the Botanical Society of America with the PRC for the past five years. Two years ago he visited China on a special invitation from the Chinese Academy of Science; since then, and arising out of discussions held during that visit, he has been working closely with Chinese scientists and those from other nations on an English translation of the monumental *Flora of China*, an 80-volume work begun more than 30 years ago and scheduled for completion by 1990.

In 1974, the Garden began exchanging seeds with the Nanjing Botanical Garden and the two institutions established a formal sister-garden relationship. As part of this relationship, staff members of each garden have visited the other. In the fall of 1981, Alan Godlewski, Chairman of Landscape Horticulture here, spent several weeks visiting Chinese institutions and returned with seeds and other plant material to cultivate here.

Many of the 400 scientists who attended the Symposium arrived early or remained after the Symposium to use the herbarium and library at the Garden. Both facilities are recognized as among the finest in the world.

The Symposium was supported, in part, by a grant from the National Science Foundation. In addition, generous contributions from Mark Twain Bancshares and anonymous donors helped to defray the expenses of some of the American scientists who attended.

Our Own Ice Age

Trees, by their nature, have a look of permanence to them: their solidity, the relative immovability, their almost mute changelessness. If we were to visit a forest we knew when we were very young, it would seem (unless altered by man) to be as it was those years ago.

It seems that that forest has always and will always be there. On a little larger scale, it seems the appearance of the vegetation of the areas familiar to us (that of the state of Missouri, for instance) have always and will always remain as they are at this instant: No matter how often and no matter over how many years we take the same drive west to Gray Summit and Shaw Arboretum, the scenery, the hillsides and trees will appear the same.

Actually a very short time ago (a very short time ago *geologically*), around 10,000 years ago, the face of Missouri was drastically different, and was dominated by forests of conifers. Today, of course, our area is dominated by forests of deciduous trees (the oaks, maples, and hickories we know so well), with only a few species of conifers (juniper and some pines) being native.

In another short period of time (again geologically speaking), after another several thousand years, the face of Missouri will again be vastly different than during our lifetime.

Over the last two million years, during what scientists call the Quaternary Period, glaciers have been advancing and receding over the entire Northern Hemisphere. Actually during about 90% of these two million years, the hemisphere has been covered by these glaciers. The other 10% of the time (or 200,000 years in total) is represented by 18 to 20 relatively brief periods during which these glaciers have retreated. These periods have lasted from 10,000 to 20,000 years each. We are in one of these periods now, what scientists call interglacial periods.

Our period is a temperate island in the middle of an ice age.

This phenomenon was discussed in a paper delivered by Dr. Margaret Davis of the University of Minnesota at the recent Systematics Symposium held at the Garden.

During the times in which the glaciers have extended far into the hemisphere, the climate is cooler and drier than in our own era. Deciduous forests cannot survive in this climate and so are reduced to extremely small pockets of favorable habitats in which are found fewer species than are present in the forests of our day.

In the interglacial periods, like the one in which we live, the deciduous forests can spread from the small areas in which they survived the glacial periods.

On our own continent, beech trees (*Fagus*) began to expand about 14,000 years ago from their refuges in the Coastal Plains of the southern United States and only reached their northernmost limit about 3,000 years ago. Chestnut (*Castanea*) reached its northern limit only about 2,000 years ago.

Since the diversity of species that survives in these hospitable pockets (called refugium) in each glacial period is different, the appearance of deciduous forests during each of the interglacial periods is also different; the vegetation of our time, that of our own island in the middle of an ice age, is unique.

If we were to study the flora of a previous interglacial period, and scientists can do this using fossil evidence, we would find that, although the climates were similar, that flora would be quite different from our own period.

Because of these changes which have been continually occurring over the last two million years, many trees which one time had a distribution across the entire hemisphere have been reduced to habitats which are, in our own day, quite limited. Three of these are the dawn redwood (*Metasequoia*), bald cypress (*Taxodium*) and maidenhair tree (*Ginkgo*).

The dawn redwood and maidenhair tree survived in southeastern Asia; the bald cypress in southeastern North America. Fossils of all three have been found in areas across the hemisphere.

The dawn redwood was, in fact, first described from fossils—in 1941—and was presumed extinct. In 1944, a Chinese forester discovered a living specimen of dawn redwood in western Hubei province. Two years later, another forester found approximately a thousand native trees about 100 miles further south, in the province of Sichuan.

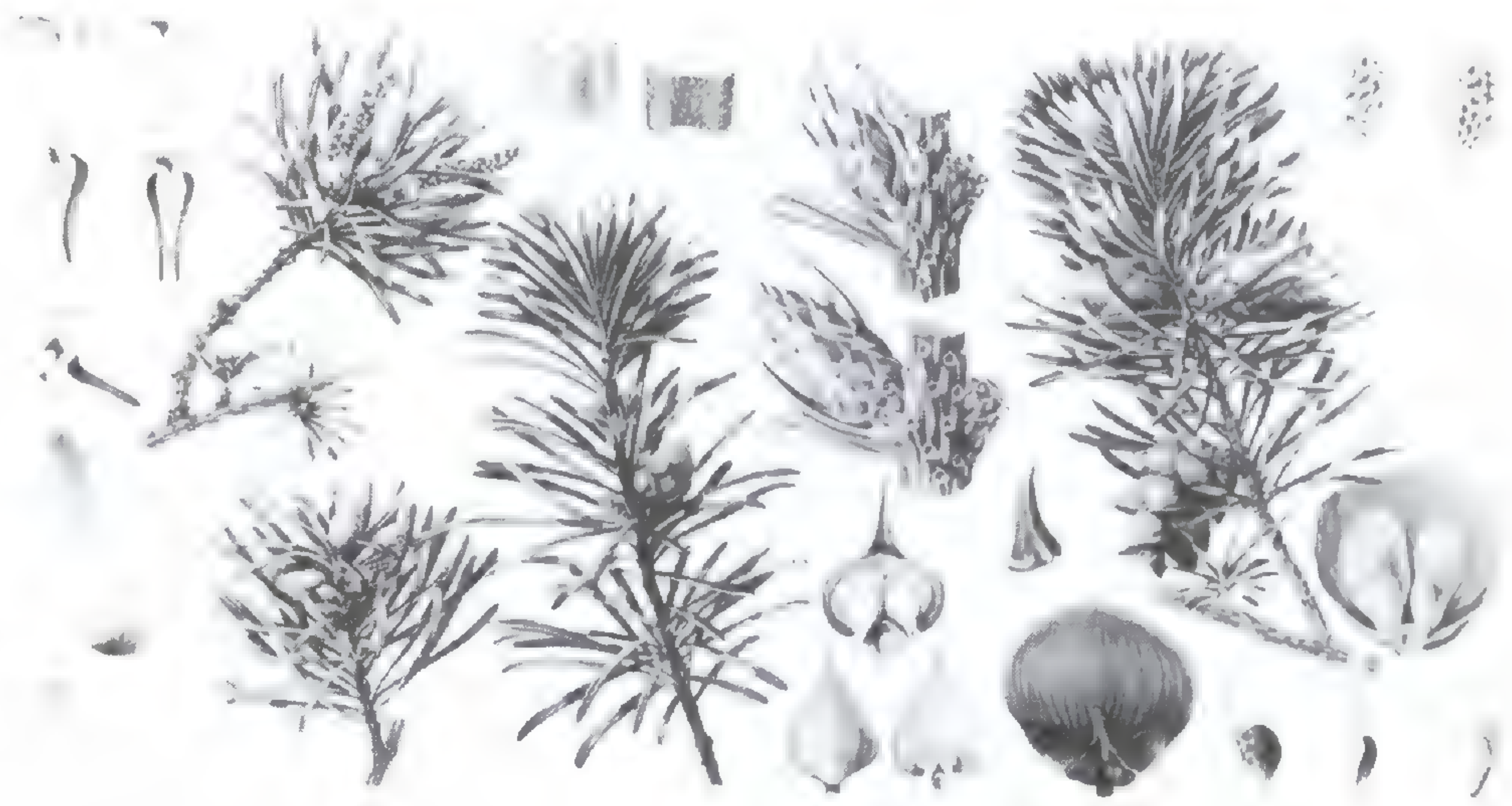
(All three of these trees are cultivated in the Garden. A line of dawn redwoods shades the eastern side of the John S. Lehmann Building. Now about 70 feet tall, they were planted from seed received from Nanjing, via the Arnold Arboretum, in 1947.

Maidenhair trees are found at several locations: near the same line of dawn redwoods (opposite the Shoenberg Fountain) and flanking the Old Main Gate.

Also near the Old Main Gate, lining the pathway that extends west from the Gate to the Climatron, are bald cypresses.)

Chinese Botanical Art

中國植物科學画



In 1955, the botanical world was stunned by the discovery of not one, but two species of a genus of conifers (previously totally unknown) in southern China. Other genera of conifers, such as pines, firs, and spruces, are well-known and of great economic value, but there are only about 50 genera and 550 species of the group in the entire world.

This new genus, discovered in China 27 years ago, was named *Cathaya* (after the ancient name of China), and is known only in cultivation in that country. The few plants that are cultivated are less than two-feet tall.

Cathaya, like the dawn redwood (*Metasequoia*; see this page, above), was subsequently found, by studying fossil evidence, to have been widespread millions of years ago, not only in Asia but in North America and Europe as well.

The illustration of *Cathaya* that appears above (right) is one of 100 botanical illustrations now exhibited in the Old Gate Building of the Missouri Botanical Garden. Continuing through December 31, *Chinese Botanical Art* contains watercolor paintings, drawings, and other kinds of illustrations of plants that are native to China; many of them, like *Cathaya*, are found nowhere else. Some are very rare.

The works included in the exhibit were shown earlier at the XIII International Botanical Congress held in Sydney, Australia, in August, 1981, and were, in fact, produced especially for the Congress. The display at the Missouri Botanical Garden is only the second time these paintings and drawings have been on public display.

Included are works by 42 artists from the People's Republic of China from 15 institutions.

The hours of the exhibit are 10 a.m.–4:30 p.m. Admission is $1; Members are admitted free of charge.

For Younger Members

Investigate Animal Tracks

Children of all ages have, at one time or another, made "angels" in fresh-fallen snow. They also delight in seeing their big snowboot tracks and mitten prints etched in a wintery blanket of white. But children are not the only living beings who leave evidence of their comings and goings during the winter season. Their footprints may be only one of many sets that encircle the snowman or skip randomly across the yard. Even a light dusting of snow reveals a footprint parade of such creatures as dogs, cats, squirrels, birds, or rabbits.

How many sets of tracks can you and your child find in the snow? To whom do the tracks belong? Let's find out.

You will need: Bits of bread, small pieces of carrot, bits of hamburger, animal track identification booklet (library).

What to do: Wait until there is a light snowfall. Sprinkle the bits of food over the snow in an undisturbed area near your home. Leave the food overnight. The next morning, inspect the area to see if you have had any animal visitors.

Study the tracks you have found. How many different tracks are there? Can you find pictures of them in the track identification booklet? Do the tracks belong to large animals or small animals? See if you can determine how the animals were moving. Were they hopping, running, walking?

Make up a story with your child about the animal visitors who left their footprints in the snow near your home.

—*Ilene Follman, Education Consultant*

Notes from the Garden

"There is a saying . . .'Art imitates life.' But I think it would be more accurate to say that in these Art captures life and holds it still so that we can appreciate . . . the life it captures."
—*C. C. Johnson Spink at the dedication of the Spink Gallery.*

Porcelain sculpture by Edward Marshall Boehm and the Boehm Studios of Trenton, New Jersey, is featured in the Spink Gallery on the second floor of the Ridgway Center. The Gallery was made possible by the generosity of Edith and C. C. Johnson Spink in memory of Blanch and Taylor Spink. Mr. and Mrs. Spink presented to the Garden their collection of more than 132 porcelain, hand-sculpted birds from the Boehm Studios, as well as Dorothy Doughty, and other artists. The Gallery contains one of the finest collections of porcelain sculpture. . . . .

An Orchid Exhibit comes to the Ridgway Center on November 6 and 7. Sponsored by the Orchid Society of Greater St. Louis, the show will include entries in 15 different categories; it will be judged by the American Orchid Society. Hours of the exhibit are, on 11/6, 11 a.m.–4:30 p.m., and on 11/7, 9 a.m. until 4:30 p.m. . . . .

The annual Holiday Plant Exhibit will be the first Garden exhibit to be held in the new Floral Display Hall of the Ridgway Center. Opening to the public on December 4 and continuing until January 2, the exhibit will feature poinsettias, cyclamen, white chrysanthemums, gloxinia, and Christmas cactus. The ficus trees in the barrel vault of the Center will be decorated with small, white lights. There will be a Christmas tree in the center of the Latzer Fountain outside the Center.

This promises to be the first in a long line of exciting exhibits that will be held in the Floral Display Hall in the years to come. . . . .

Missouri
Botanical
Garden

(l to r) C. C. Johnson Spink, President of the Board of Trustees, and John G. Buettner, Chairman of Shipping Utlities, Inc.

A new tram especially designed to accommodate handicapped visitors has been in operation for several weeks now. It is a gift from the estate of Isabelle Schwerdtmann, former Garden Member and volunteer, and was also made possible by the generosity of Shipping Utilities, Incorporated and its Chairman, John G. Buettner. Handicapped visitors may ride the tram free of charge. The trams feature a 20-minute, tape-narrated tour of the Garden grounds. An earlier gift from the estate of Isabelle Schwerdtmann was the carillon in Tower Grove House, installed in December, 1981. . . . .

There are also newly recorded versions of the tram and acoustiguide tours.

Mrs. Christopher S. Bond, wife of Missouri Governor Christopher S. Bond, was in Tower Grove House at the Missouri Botanical Garden in August to announce a fund-raising campaign for the preservation of the Governor's Mansion in Jefferson City. Tower Grove House was selected as the location for the announcement because of the Garden's own active historic restoration program and because both Tower Grove House and the Governor's Mansion were designed by George I. Barnett, the renowned Victorian architect who also designed the Museum Building, the Linnean House, and the Townhouse (now Administration Building) at the Garden. Persons interested in the program for the preservation of the Governor's Mansion may write to: The Missouri Mansion Preservation, Inc., P.O. Box 1133, Jefferson City, Missouri 65102. . . . .

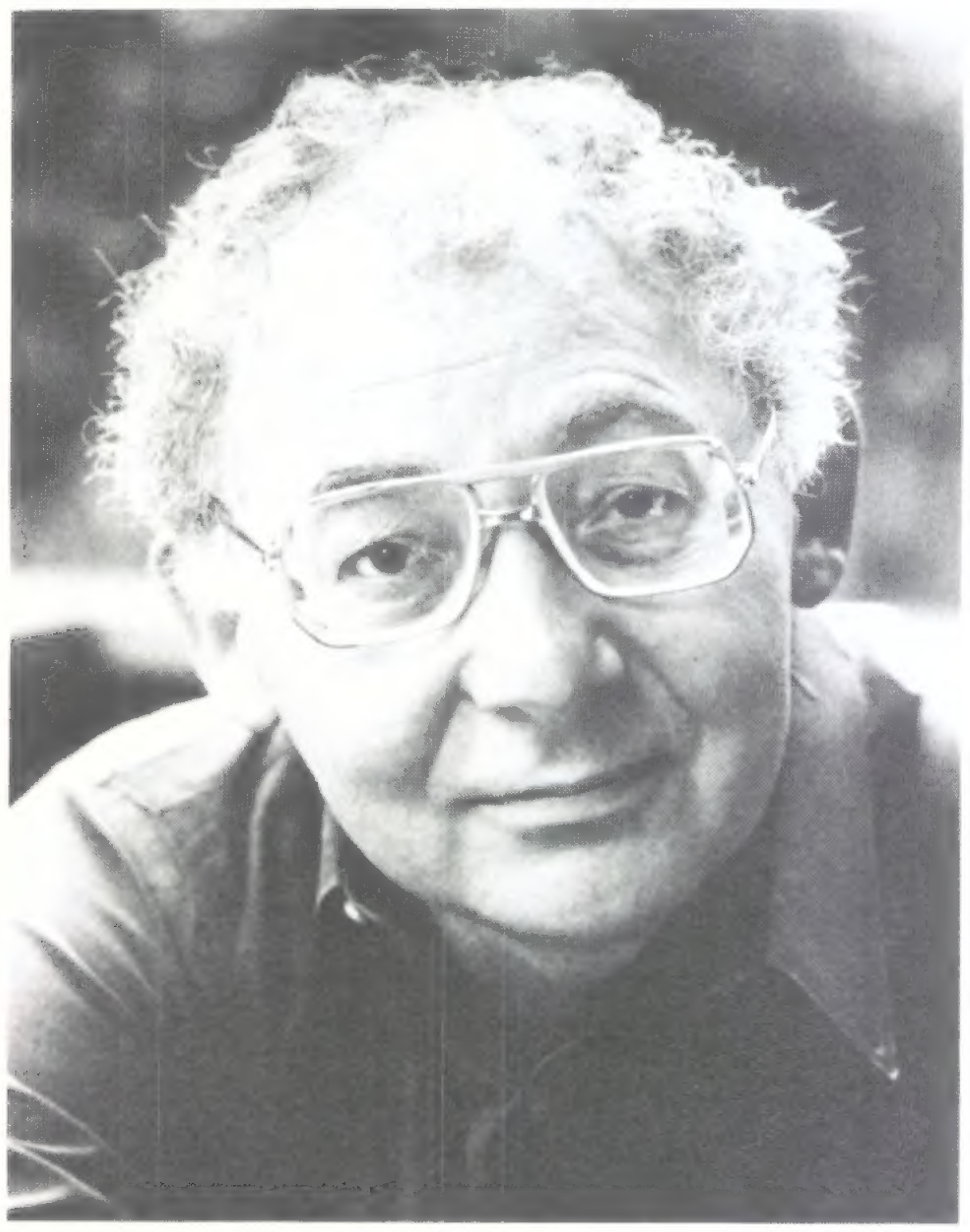
The Tribute Fund of the Missouri Botanical Garden is an excellent way to recognize the special people and events in your life. Contributions have been made by Members in the past to honor their friends or relatives on their birthdays, anniversaries, graduations. Contributions have also been made in memory of parents, grandparents, and other relatives. For your convenience, an envelope for Tribute Fund contributions is bound into the center of this *Bulletin*. For information about the Fund, contact the Development Office at 577-5120. . . . .

With winter coming, a tram tour of the Garden—the trams are heated—can be a pleasant way to spend a half-hour. No matter how often you've been to the Garden, if you've never taken a formal tour, you could learn some things you don't know. . . . .

Birds of Prey, a lecture by Walter Crawford at the Arboretum on November 13 from 9:30 a.m.–2:00 p.m., will feature live hawks and owls. The lecturer works with the Raptor Rehabilitation and Propagation Center, which is involved in the raising of hawks and owls. This past winter, the Center's staff released Barn Owls at the Arboretum; Barn Owls are endangered species in Missouri.

For more information about the lecture on these fascinating predators, or to register for the lecture, call the Arboretum at 577-5138. The fee for Members is $5. . . . .

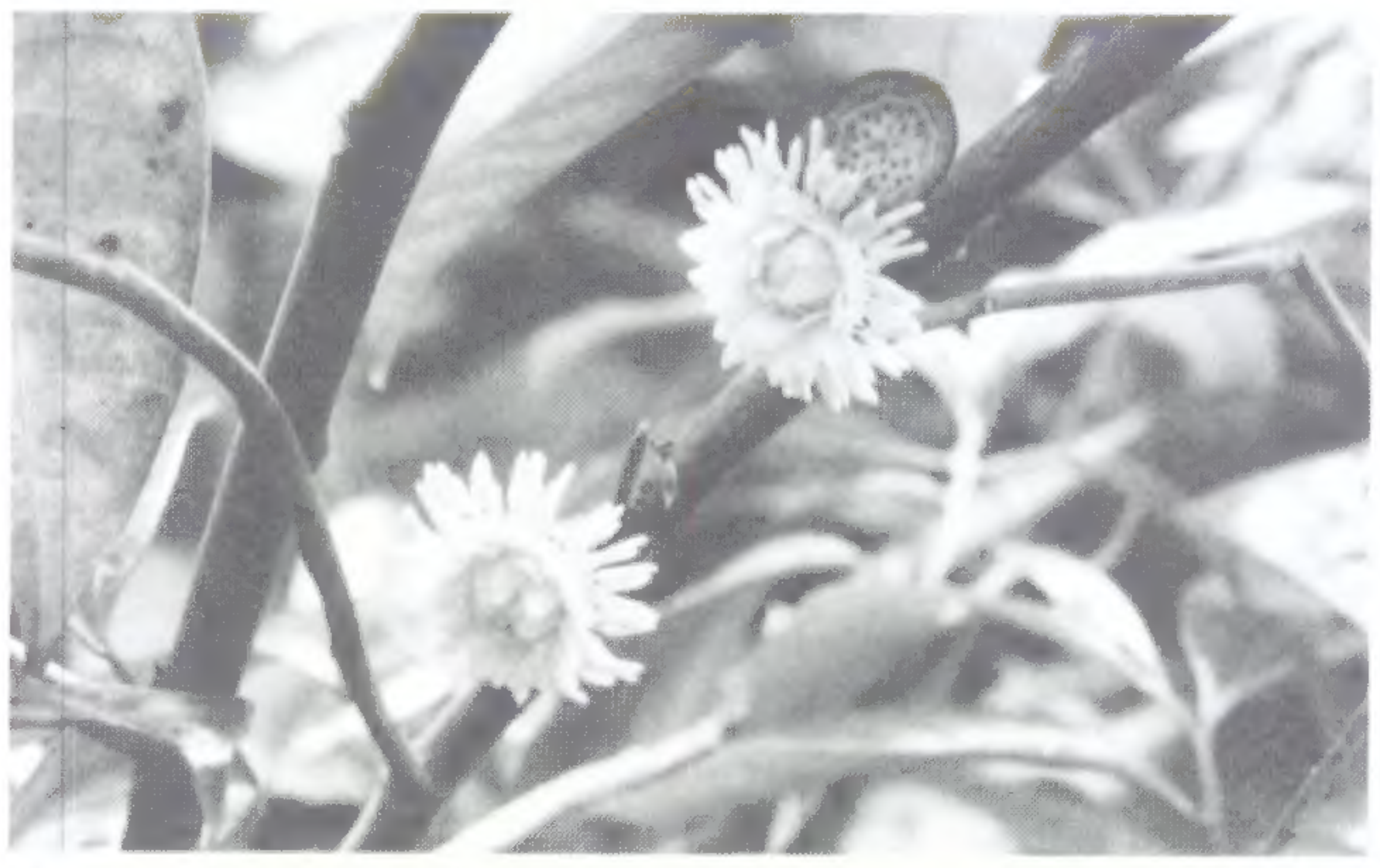
Nature themes, fairy tales, and fables . . . The Gateway Storytellers of St. Louis are presenting stories for children every Saturday morning at 10:00 a.m. in the Garden Room of the Ridgway Center. The series will end with a storytelling round on December 18, 1 until 5 p.m., featuring several storytellers. Hot chocolate and Christmas cookies will be served throughout the afternoon. There is a nominal fee for the sessions; for information, call 577-5140. . . . .



Stanley Elkin, novelist, will present a reading from his own work as the second program of River Styx P.M., a series of readings held in the Shoenberg Auditorium of the Missouri Botanical Garden and sponsored by Big River Association. Elkin is the author of *The Dick Gibson Show*, and the recently published *George Mills*, and is a member of the faculty of Washington University. Tickets are available at Paul's Books and Left Bank Books. Garden Members receive a 10% discount. . . . .

Donald R. Niederlander

A recent gift from the family of a former library volunteer has resulted in the establishment of the Donald R. Niederlander Memorial Collection in the library's bindery. The Niederlander Memorial Collection consists of several hundred publications on bookbinding, preservation of library materials, papermaking, paper marbling, and related arts and crafts. Mr. Niederlander served as a volunteer in the library's bindery for 10 years, and was responsible for restoring many of the Garden's rare and fragile books. . . . .



A unique plant native only to New Guinea and eastern Australia, *Eupomatia laurina* belongs to a primitive genus that now has no close relatives. Pollen very similar to modern-day *Eupomatia* pollen has been found in deposits 70 million years old. *Eupomatia* is the only member of the family Eupomatiaceae and it includes one other species, *E. bennettii*, that is found in eastern Australia only. (Compare this with Rosaceae or the rose family for example, which has one hundred genera and 2,000 species.)

These shrubs or small trees bear small flowers that have an inside-out look to them. The petal-like structures are near the center of the flower and the stamens (pollen-bearing parts) are on the outer edge of the flower. They are both attached to a firm cup or receptacle in which the female, seed-bearing, parts are buried. The "petals" are actually stamens that are fleshy and sweet-smelling. Beetles are attracted to these "petals," eat them, and probably act as pollinators, transferring pollen from one flower to another.

Few collections of this genus are known. It is a rare and wonderful opportunity to have this unusual plant blooming in our Garden. . . . .

Three more lectures remain in the Fall Lecture Series, *The Unique World of the Tropics.* On November 3, Tom Economou, Master Gardener and Botanical Explorer will lead the celebration of a "Tropical Fruit Fiesta." Janet Catherine Berlo, Assistant Professor of Art History at UMSL will discuss "The Maya: An Ancient Civilization of the American Tropics" on November 10. The lecture series closes on November 17 when Peter H. Raven, Director of the Garden, talks on "The Future of the Tropics." All lecture dates are Wednesdays and lectures are presented at 10:30 a.m. and 8 p.m. on each date. . .

Notes *(continued from page 9)*

***The Sullivan Fountain**, on the path between the Old Gate Building and the Museum Building, placed in memory of Owen Jacquemin Sullivan and Sarah Ott Sullivan by Sally Sullivan Bernhardt.*

Staghorn ferns will be exhibited in the Climatron from November 6-28. Members of the genus *Platycerium*, staghorn ferns are epiphytes native to the tropics, from Africa to Southeast Asia to Australia and New Guinea. Hours of the exhibit are 10 a.m. until 4:30 p.m. . . . .

The Garden on your wall for 1983—the 1983 Missouri Botanical Garden Calendar, featuring stunning close-up photography of flowers of the Garden, is now available in the Garden Gate Shop. The photography is by Jack Jennings, whose pictures were featured in the 1982 calendar, and Steve Frowine, Chairman of Indoor Horticulture at the Garden. (The price is $4.95; Members receive a 10% discount.) . . . .

Two sales are scheduled for Members of the Garden. The annual Holiday Preview Sale in the Garden Gate Shop will be held on November 10-11. All merchandise, including the finest in gifts, plants, china, and botanical prints, will be available to Members at a 20% discount. The book department includes one of the most complete selections of books on gardening, botany, and natural history in the country.

On December 10, 11, and 12, Members are invited to the annual Holiday Plant Sale in the Plant Sales area of the Garden Gate Shop. All plants will be on sale at a 20% discount, and the shop will feature the plants traditionally associated with the season. Members will receive further information in the mail.

. . . .

Members' previews of the Holiday Plant Exhibit are scheduled for December 3-4. On Friday, the third, Members are invited for a reception for the opening of the exhibit from 5:30 until 7:30 p.m. On Saturday, the fourth, from 10 a.m. until 2 p.m., the Garden has planned a special Family Holiday, with storytelling and family entertainment. Details will be sent to all Members shortly. . . . . . .

The next time you are at the Garden, stop for a few minutes into the orientation theater on the first floor of the Ridgway Center. The theater features a continuously running film about the Garden, its history and displays. . . . .

Richard Daley has been named as Director of the newly created Division of Public Services at the Missouri Botanical Garden. Mr. Daley, formerly Special Assistant to the Director, has been a member of the Garden's staff since 1973. He has been active in the Garden's efforts to seek public funding. He has also supervised the historic restoration program, which has resulted in the recent restoration of the Linnean House and the Museum Building.

The Division of Public Services includes the Departments of public relations, special events, education, merchandising, and the Arboretum. . . . . . .

Dr. Peter Goldblatt was the recipient of the first Harold Compton Prize from the National Botanic Gardens of South Africa. The Prize was created to honor "the author of the best contribution to botanical science . . . concerning the South African flora." Dr. Goldblatt is the B.A. Krukoff Curator of African Botany at the Missouri Botanical Garden.

. . . .

Taxes and Charitable Gifts

As you approach the end of 1982, you should be considering your year-end tax planning strategy. An important part of this strategy is charitable contribution. In addition to the personal satisfaction that comes from gift-giving, you also derive many tax benefits.

This year it is even more important to carefully plan your tax strategy. Because the Economic Recovery Tax Act of 1981 provides for a decrease in taxes in 1983, a deduction in 1982 is of greater value than one in 1983.

In general, cash contributions to charitable and cultural organizations, like the Missouri Botanical Garden, are fully deductible from your adjusted gross income, up to 50% of this income.

For donations of long-term capital gain type property—for example real estate and securities held more than twelve months—the limit is 30% of your adjusted gross income.

If you contribute capital gain property that has appreciated, you may deduct the full market value. However, securities that have depreciated to a value below their original cost should not be used as charitable contributions, since you would forfeit the tax loss. It is better to sell the securities, take the tax loss, and then contribute the cash proceeds.

—Richard Markow, Alexander Grant & Co., Certified Public Accountants

New Members

August & September 1982

Sustaining Members

Ms. Susan M. Dickens
Mr. and Mrs. Irving Edison
Mr. and Mrs. Kenneth R. Fiala
Mr. and Mrs. Stephen H. Loeb
Mr. and Mrs. Clark B. Payne
Dr. and Mrs. John B. Shapleigh
Mr. and Mrs. Buford D. Smith

Contributing Members

Mr. and Mrs. Lowell L. Barton
Mr. and Mrs. Hunt Benoist
Mrs. W. F. Boldt
Mr. and Mrs. Richard H. Bosch
Mr. and Mrs. Jim Brennan
Mr. and Mrs. Steven W. Bromley
Mr. and Mrs. Jack Carey
Mr. and Mrs. Anthony J. Chivetta
Mrs. Horace E. Corey, Jr.
Mr. and Mrs. F. J. Cornwell
Mr. and Mrs. James J. Denby
Mr. John O. Felker
Mr. and Mrs. Donald C. Flinn
Ms. Bonnie Gates
Miss Cheryl Gates
Mr. Robert Griesbaum
Mr. and Mrs. Bruce Halliday
Mr. and Mrs. George L. Hanna
Mr. Gordon D. Holt (Holt Family)
Mr. Thomas Janosky
Dr. and Mrs. Robert Karsh
Ms. Donna M. Kinder
Sister Helen LeDuc
Ms. Bobbie Mackay
Ms. Jeanne E. Martin
Mr. R. V. McCreary
Mr. and Mrs. Wayne Miller
Mrs. W. E. Moser
Mr. and Mrs. Chris Mott
Mr. and Mrs. Clifford Pyles
Mr. and Mrs. Dennis Rabbitt
Mr. and Mrs. Ralph A. Ross
Mr. and Mrs. Fred Rottler
Ms. Barbara A. Rubinelli
Mr. and Mrs. Steven T. Rufer
Mr. and Mrs. William J. Schmidt
Mr. and Mrs. Jack H. Schwarz

(continued on page 11)

New Members

(continued from page 10)

E. M. Schueneman
Dr. and Mrs. Leon S. Shanley
Dr. and Mrs. C. Shaw
Mr. Ned Siegel
Mr. and Mrs. Scott Stanley
Mr. and Mrs. Grant A. Sudholt
Mr. and Mrs. Edgar L. Taylor
Dr. and Mrs. James Utley
Dr. and Mrs. James V. Vest
Mr. and Mrs. Arthur Woodall
Mr. and Mrs. Paul O. Wright
Mr. and Mrs. Robert G. Zwart

Tributes

August & September 1982

IN HONOR OF:

Mrs. Harold M. Baer
Mr. and Mrs. John Blumenfeld
Mr. Alvin Burstein
Mr. and Mrs. Jospeh Floret
Hortense Katz
Ruth Planje
Mrs. William H. Schield
Mr. and Mrs. H. Schiele
Mr. and Mrs. J. Henry Schweich
Mr. and Mrs. Malcolm Steiner

Mr. and Mrs. Robert McN. Cochran
Mr. and Mrs. Robert B. Smith

Mr. and Mrs. Charles Cook
Mr. and Mrs. Gerard Faigen

Mrs. Jane Coultas
Mr. and Mrs. Edward Hopper

Mrs. Samuel Crasilneck
Seva Roberts

Mr. and Mrs. Walter Ehlers
Mr. and Mrs. Dale W. Ehlers

Mr. and Mrs. John Felker
Mr. and Mrs. W. T. Dooley, Jr.
Mr. and Mrs. Wm. A. Frank

Mrs. Stephen Gould
Mrs. Helen Marie Bruce
Mrs. Wm. H. Frank
Mrs. H. W. Hagnauer
Mrs. Ione A. Pilkington
Mrs. Gus Riesmeyer
Mrs. C. F. Spaethe
Mrs. Dorothy Von Hoffmann

Mr. David Gutman
Mr. and Mrs. Clarence Mange

Mr. Whitney Harris
Mrs. Henry Freund

Mrs. Henry Hitchcock
Mrs. J. A. Jacobs

Mrs. Ilse Jordan
Mr. and Mrs. Walter J. Heiman

Mr. and Mrs. Joe Laba
Mr. and Mrs. Leon Bodenheimer

Mr. Jerome Lane
Dr. and Mrs. Milton Kardesch

Mr. Ira Lang
Mrs. Herbert Frank

Mr. and Mrs. Abe Lewin
Mrs. Ben H. Senturia

Mr. R. E. Lortz
Mr. and Mrs. Edward Hopper

Joyce Niewoehner
Seven Pines Garden Club

Mr. and Mrs. Richard Ostrow
Myrtle G. Weinrobe

Ms. Mimi Postol
Mr. Peter Postol

Miss Kathryn Amelia Raven
Executive Board of the Members
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Mrs. Jamerson C. McCormack

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Dorothy and Hub Moog

Mr. Don Thebeau
Country Lane Woods Garden Club

Mr. Jonas Weiss
Mr. and Mrs. K. F. Sherman

Mrs. Ben Wells
Mrs. Jamerson C. McCormack

IN MEMORY OF:

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Lad and Francis Curley

Mr. William Akins
Mr. and Mrs. Robert LaMear

Frank Aldrige
Betty and Dean Garner

Donald Alnutt
Mr. and Mrs. Milton Johnson

Phoebe Anderson
St. Louis Herb Society
St. Louis meeting of the Religious Society

Mr. James Barbero
Mr. and Mrs. B. R. Yoder

Mr. Bronson S. Barrows
Mrs. P. A. Gardner
Mr. and Mrs. James K. Mellow

Lucille Beall
Dr. Lynette Beall
The Brook Family

Pauline Beil
Mr. and Mrs. A. Lerman

Lucille Berry's Mother
Mrs. June Kravin

Mr. Carl A. Bischoff, Jr.
Norma Kissner
Dean Lowman
Robert Lowman

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Mrs. Leroy Royer

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Mrs. Helen Callahan
Mr. and Mrs. Andrew Kocot
Gussie Mohlman

Mrs. Chester Chapline
Hazel L. Knapp

Mr. Edward G. Cherbonnier
Mr. and Mrs. M. M. Eakins
Louise Goulding
Mary Frances Hazelton
Miss Phyllis McPheeters
Mrs. Samuel B. McPheeters
Owen H. Mitchell
H. B. Sperling and Family

Mrs. Leo Chrobot
Mr. and Mrs. Gerald A. Koetting

Mr. Albert Cohen
Ben Cohen
B'nai B'rith Bowling League

Mrs. Gladys Dawson
Mr. Fred Rock

Mrs. Grace Dee
Country Lane Woods Garden Club

Homer M. Dinzler
Mr. Ron Glazer

Mr. Edmond Dreyfus
Ellen F. Harris

Barbara Aleen Flynn
Art and Betty Hegedus

Mrs. Anna M. Forsing
Mr. Jim Moore

Mrs. Flora M. Froehlich
Mr. and Mrs. Michael Weigert

Mr. Joseph Gerchen
Mr. and Mrs. I. B. Rosen

Mr. Boyd Rogers Goodloe
Mr. and Mrs. John B. Henkle

Mrs. Stanley Goodman
Mr. and Mrs. A. Bakewell
Dr. and Mrs. Peter H. Raven

Mr. Raymond Grant
Mr. and Mrs. R. Garrett
Mr. and Mrs. G. Greenwald
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Mr. and Mrs. Arthur P. Skinner and the Skinner Family

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Mr. and Mrs. W. R. Orthwein, Jr.
Mr. and Mrs. H. Parker Smith

Pete Kobzoff
Phil and Carol Chew

Mr. Robert H. Koenig
Mr. and Mrs. W. R. Orthwein, Jr.

Mrs. Phyllis Krueger
Judy Hutsell

Anthony S. Kubon
Ms. Carol L. Kubon
Mr. and Mrs. Fred Smalley, Jr.

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Mr. and Mrs. Irvin H. Landwehr

Mrs. Louise Loveridge
Edwin Codding
Barbara Painter
Claudia C. Sarber
Lucille Smith

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Ella Tappmeyer

Elizabeth T. Meisenbach
Jos. W. Daues
Forest Haven Association

Diane Heiss Moore
Audrey and Bill Smith

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Mr. and Mrs. James G. Forsyth
Mrs. P. A. Gardner
Mr. and Mrs. Stanley F. Jackes

Mrs. James Mullally
Mr. and Mrs. John Eirten

Mrs. Vern Nicol
Patricia R. Williamson

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Mr. and Mrs. John Eirten

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Mr. Wilhow Pokela
Mr. and Mrs. A. L. Guise

Mrs. Marjorie R. Reimers
Mr. and Mrs. James M. Henderson
Mr. and Mrs. Robert LaMear

Mrs. Mary L. Rhoads
Mr. and Mrs. Si C. Dietz
Heritage House Garden Club
Clifford E. Lecoutour
Mercedes E. Nitzschmann
Dr. and Mrs. Robert H. Rhoads

Judith Richter
Mr. and Mrs. C. Richard Beard
Mr. and Mrs. Thomas W. Hizar

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Mrs. Wm. H. Schield

Don Rishoi
C. J. Maurer

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Elise S. Coleman
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Mrs. Richard Mullen
Lorraine and George Rendleman
Mabel Schray
Mildred M. Shortal
Mr. and Mrs. John C. Smith
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Virginia Culver
Mrs. Rudolph E. Smyser, Jr.

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Mr. and Mrs. Henry Croskell

Janet Slifer
Bob and Susie Schulte

Mrs. Margaret Snyder
Frances and Harry Weier

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Mr. and Mrs. James Lane

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Mr. and Mrs. James G. Alfring
Mr. and Mrs. George C. Bitting
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Dr. Harold M. Cutler
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Adolph Tegtmeyer
Mr. and Mrs. Jules D. Campbell

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Fish Swimming Amid Falling Flowers

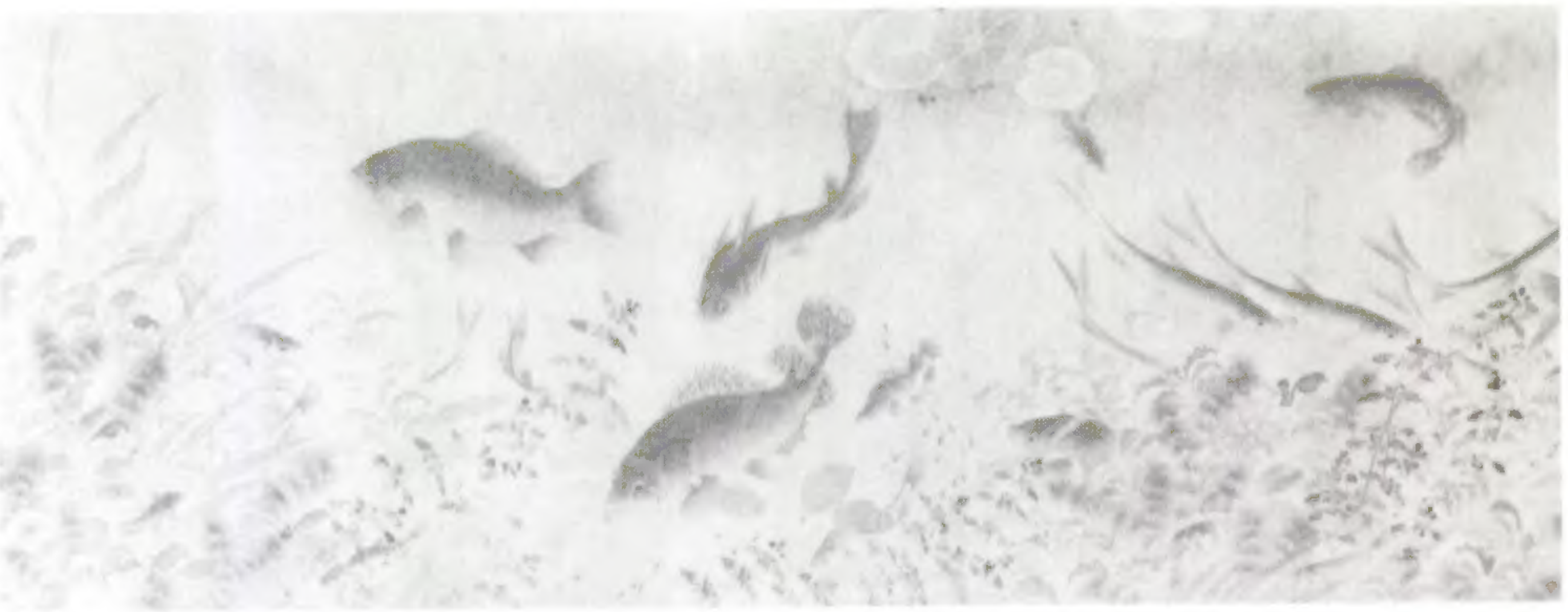
comme le pan de mur jaune que peignit avec tant de
science et de raffinement un artiste à jamais inconnu,
a peine identifié . . .

On a ground of pale gold water of watered silk
The painter of a thousand years ago
Angled his wrist so rapidly and right
The hairs of the brush bent in obedience
To do the swerve and diagonal of these fish
Swimming in space, in water, on watered silk,
And stippled in the detail of their scales,
The pale transparency of tail and fin,
And dotted at the brush's very tip
The petals falling and the petals fallen,
And scattered a few lotus and lily pads
Across the surface of the watered silk
Whose weave obedient took all this in,
The surface petal-flat, the fish beneath
The golden water of the watered silk,

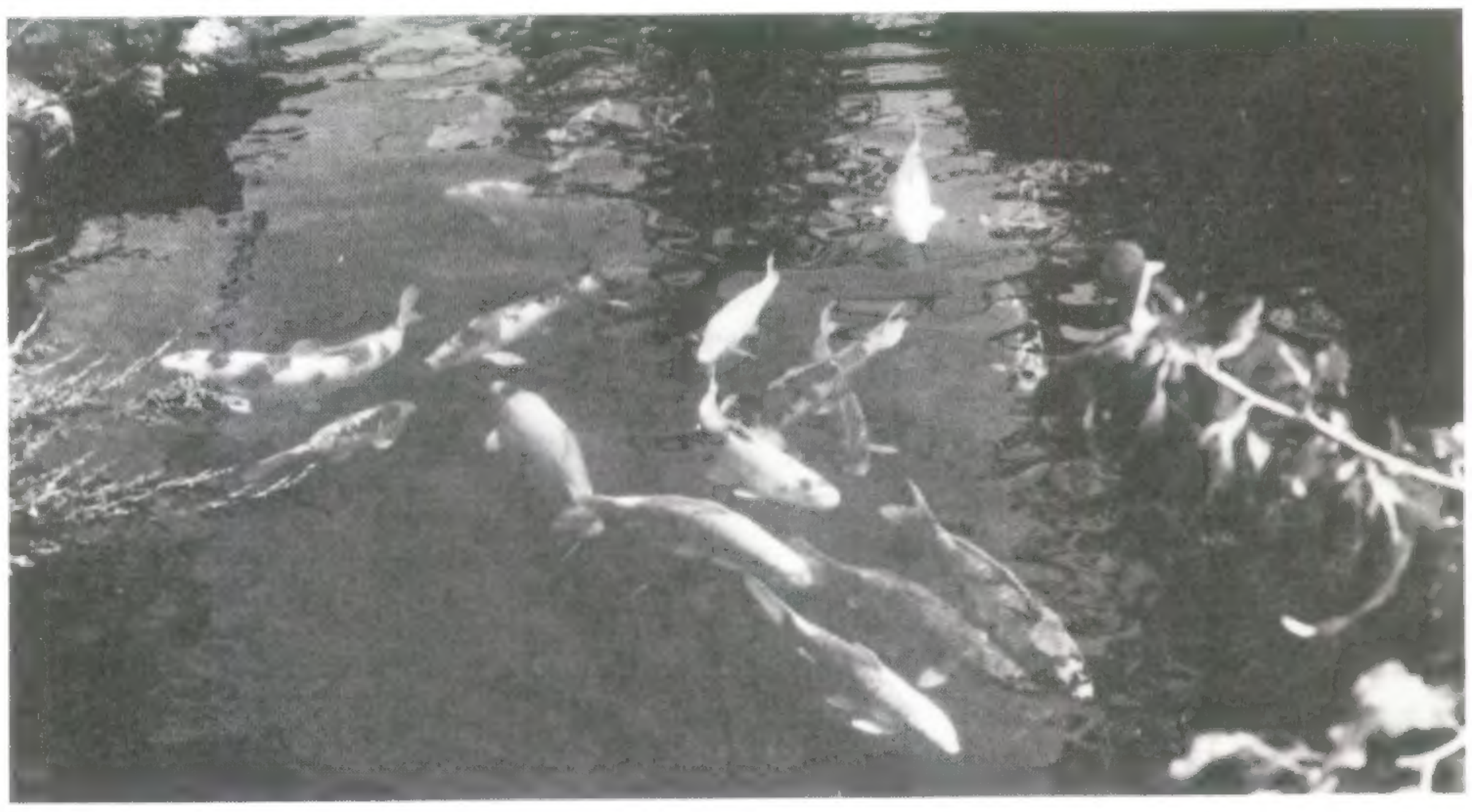
So that a thousand years of the world away
On this millennially distant shore of time
The visitor to the museum may stare
Bemused down through the glass hermetic seal
At the silken scroll still only half unrolled
Past centuries invisible as air
To where the timeless, ageless fish still swim,
And read the typescript on the card beside
That says "Fish Swimming Amid Falling Flowers"
A thousand years ago, and seeing agree
That carp have always swum, and always will,
In just that way, with just that lightning sweep
Of eye, wrist, brush across the yielding silk
Stretched tight with surface tension as the pool
Of pale gold water, pale gold watered silk.

—Howard Nemerov

Howard Nemerov, a member of the faculty of Washington University, has received both the Pulitzer Prize and the National Book Award for his Collected Poems.



(The picture, in the St. Louis Art Museum, is attributed to the Northern Sung painter Liu Ts'ai. Proust's painter of the pan de mur jaune *was, of course, Vermeer.)*



Readers interested to check out Liu Ts'ai's version against current carp going about their business will do well to look down from the bridge over the lake at the Japanese Garden called Sei-wa En at Shaw's Garden, St. Louis. Between life and art there are differences, but only the ones you would expect; ink is thicker than water, not by much. —H.N.

The painting, *Fish Swimming Amid Falling Flowers,* is one of more than 100 works currently featured in *Treasures from the East: Asian Art from the Collection* which continues at The Saint Louis Art Museum until November 14. For information, call the Museum at 721-0067.

Asian art with a slightly different emphasis is currently displayed at the Missouri Botanical Garden. *Chinese Botanical Art*, in the Old Gate Building, continues through December 31. Further information about this exhibit is found on page 7 in this *Bulletin*.

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